

BRITISH STANDARD 4727 : Part 2 : Group 03 : 1971

UDC 001.4 : [621.3 + 628.9 + 535]

CONFIRMED SEPTEMBER 1979

GLOSSARY OF ELECTROTECHNICAL, POWER, TELECOMMUNICATION, ELECTRONICS, LIGHTING AND COLOUR TERMS

PART 2. TERMS PARTICULAR TO POWER ENGINEERING

Group 03. Rotating machinery terminology

BS 4727 : Part 2 : Group 03 : 1971

**GLOSSARY OF
ELECTROTECHNICAL, POWER,
TELECOMMUNICATION,
ELECTRONICS, LIGHTING AND
COLOUR TERMS**

**PART 2. TERMS PARTICULAR TO
POWER ENGINEERING**

Group 03. Rotating machinery terminology

CONFIRMED SEPTEMBER 1979

BRITISH STANDARDS INSTITUTION

Incorporated by Royal Charter

2 PARK STREET, LONDON W1A 2BS

Telex: 266933

Telephone: 01-629 9000

THIS BRITISH STANDARD, having been approved by the Electrical Industry Standards Committee and the Telecommunication Industry Standards Committee, was published under the authority of the Executive Board on 18th August, 1971.

© British Standards Institution, 1971.

SBN: 580 06734 3

The Institution desires to call attention to the fact that this British Standard does not purport to include all the necessary provisions of a contract.

In order to keep abreast of progress in the industries concerned, British Standards are subject to periodical review. Suggestions for improvements will be recorded and in due course brought to the notice of the committees charged with the revision of the standards to which they refer. A complete list of British Standards, numbering over 9000, fully indexed and with a note of the contents of each, will be found in the BSI Catalogue. The BSI Catalogue may be consulted in many public libraries and similar institutions.

British Standards are revised, when necessary, by the issue either of amendment slips or of revised editions. It is important that users of British Standards should ascertain that they are in possession of the latest amendments or editions.

The following BSI references relate to the work on this standard:

Committee reference ELE/TLE/1/11

Drafts for comment D65/3193, 66/3880 and 66/23129

CO-OPERATING ORGANIZATIONS

The Electrical Industry Standards Committee and the Telecommunication Industry Standards Committee under whose supervision this British Standard was prepared consist of representatives from the following Government departments and scientific and industrial organizations:

- | | |
|---|---|
| Associated Offices' Technical Committee | *Electronic Valve and Semi-conductor Manufacturers' Association |
| *Association of Consulting Engineers | *Engineering Equipment Users' Association |
| Association of Manufacturers of Domestic Electrical Appliances | *Institution of Electrical Engineers |
| Association of Mining Electrical and Mechanical Engineers | *Institution of Electronic and Radio Engineers |
| Association of Supervisory and Executive Engineers | Institution of Production Engineers |
| *British Broadcasting Corporation | *Lighting Industry Federation Limited |
| *British Electrical and Allied Manufacturers' Association | *Ministry of Defence |
| *British Radio Equipment Manufacturers' Association | Ministry of Defence, Army Department |
| *British Radio Valve Manufacturers' Association | *Ministry of Defence, Navy Department |
| *British Railways Board | *Ministry of Public Building and Works |
| Cable and Wireless Limited | *Ministry of Technology |
| Crown Agents for Oversea Governments and Administrations | Municipal Passenger Transport Association (Incorporated) |
| Department of Employment and Productivity | National Inspection Council for Electrical Installation Contracting |
| Electric Cable Makers' Confederation | National Physical Laboratory (Ministry of Technology) |
| Electrical Contractors' Association (Incorporated) | Oil Companies Materials Association |
| Electrical Contractors' Association of Scotland | *Post Office |
| Electrical Research Association | Public Transport Association (Incorporated) |
| *Electricity Council, the Central Electricity Generating Board and the Area Boards in England and Wales | Radio and Electronic Component Manufacturers' Federation |
| *Electronic Engineering Association | Relay Services Association of Great Britain |
| | *Science Research Council—Radio and Space Research Station |
| | Scientific Instrument Manufacturers' Association |
| | Society of British Aerospace Companies |
| | South of Scotland Electricity Board |
| | *Telecommunication Engineering and Manufacturing Association |

The Government departments and scientific and industrial organizations marked with an asterisk in the above list, together with the following, were directly represented on the committee entrusted with the preparation of this British Standard:

Association of Electrical Machinery Trades
Institute of Physics and the Physical Society
Telephone Manufacturers' Technical Development Committee

Radio and Electronics Technical Press
Small Electric Motor Manufacturers' Association

GUIDE TO THE GLOSSARY

Part 1. Terms common to power, telecommunications and electronics

- Group 01. Fundamental concepts
- Group 02. General technological terminology
- Group 03. Relay terminology
- Group . Semiconductor terminology*
- Group . Electronic tube terminology*
- Group . Measurement terminology*
- Group . Magnetism terminology*
- Group . Radiological terminology*
- Group . Radio interference terminology*
- Group . Integrated electronic circuit terminology*

Titles to any further groups will be added in due course.

Part 2. Terms particular to power engineering

- Group 01. General power terminology
- Group 02. Static convertor terminology
- Group 03. Rotating machinery terminology**
- Group 04. Transformer terminology*
- Group 05. Voltage fluctuation terminology*
- Group . Power switchgear terminology*
- Group . Power systems terminology*
- Group . Systems operation terminology*
- Group . Traction terminology*
- Group . Tariffs terminology*

Titles to any further groups will be added in due course.

* Not yet published, as at July, 1971.

Part 3. Terms particular to telecommunications and electronics

- Group 01. General telecommunication and electronics terminology
- Group 02. Telephony terminology
- Group 03. Telegraphy, including facsimile terminology
- Group 04. Broadcasting, radio and television terminology
- Group 05. Propagation and media terminology
- Group 06. Radio location and navigation terminology
- Group 07. Radiocommunication terminology

Titles to any further groups will be added in due course.

Part 4. Terms particular to lighting and colour

- Group 01. Radiation and photometry terminology
- Group 02. Vision and colour terminology
- Group 03. Lighting technology terminology

CONTENTS

	Page	Page
erating organizations	2	Foreword
to the glossary	3	5

GLOSSARY

MACHINES	7	203 32 Mechanical structure	24
1 General	7	203 33 Cooling circuit	26
2 Generators	7	203 34 Machine enclosures	27
3 Motors	8	203 35 Supplementary qualifying terms	29
4 Special machines	11		
5 Machines for control systems	13	203 4 MACHINE CHARACTERISTICS	30
6 Qualifying terms	13	203 41 Parameters	30
		203 42 Characteristics	30
WINDINGS. MAGNETIC AND ELECTRICAL PARTS	15	203 43 Characteristic values	31
1 Winding arrangements	15	203 44 Analytical quantities	34
2 Construction of windings	17	203 45 Ratios of values	35
3 Insulation	18	203 46 Load, duty and rating	38
4 Magnetic parts	19		
5 Brushgear, collectors, commutators, terminals	20	203 5 OPERATION AND TESTING	40
		203 51 Operation	40
MECHANICAL PARTS. TYPES OF ENCLOSURE	23	203 52 Testing	43
1 Bearings and lubrication	23	ALPHABETICAL INDEX	47

BRITISH STANDARD GLOSSARY OF ELECTROTECHNICAL, POWER, TELECOMMUNICATION, ELECTRONICS, LIGHTING AND COLOUR TERMS

Part 2. Terms Particular to Power Engineering

Group 03. Rotating machinery terminology

FOREWORD

This Group of Part 2 of this British Standard Glossary, prepared under the authority of the Electrical Industry Standards Committee and the Telecommunication Industry Standards Committee, contains terms and definitions relating to rotating machinery and supersedes some of the earlier terms and definitions of BS 205*. The terms and definitions are in close agreement with the corresponding terms in the latest edition of the International Electrotechnical Vocabulary prepared by the International Electrotechnical Commission (IEC).

In this new glossary a number of significant changes have been introduced. It has been decided to combine into one glossary the subjects previously covered by BS 204†, BS 205, BS 233‡ and BS 1611§ glossaries. The glossary is divided into four main Parts, each of which is further subdivided into groups. Each group will comprise the terms and definitions used in a particular branch of electrical engineering and will be issued individually as soon as it is completed. This arrangement makes it possible to add new groups, or revise existing groups, at any time without affecting the remainder of the glossary.

The four main Parts of the glossary are as follows:

Part 1. Terms common to power, telecommunications and electronics.

Part 2. Terms particular to power engineering.

Part 3. Terms particular to telecommunications and electronics.

Part 4. Terms particular to lighting and colour.

As groups of terms within the new framework are published, the corresponding parts of the British Standard glossaries mentioned above will be withdrawn. Ultimately the new glossary will replace these standards completely and they will then be withdrawn.

Fundamental and general terms common to power, telecommunications and electronics, respectively form the first two groups of Part 1. General terms particular to Part 2 and Part 3 similarly form the first groups of their respective Parts. The specialist groups contain only the terms and definitions relating to their subject.

As far as has been practicable all terms and definitions established in current usage and falling within the scope of this glossary have been included. Experience has shown that it is rarely possible to replace, or even to modify, a well established term no matter what the logical or aesthetic shortcomings of that term may be. Current usage has therefore been accepted as the authority for terms and their meanings except where there has been a very good reason for doing otherwise, as, for example, where terms have been considered to be fundamentally wrong, ambiguous, superfluous or in need of standardization. Where two or more synonymous terms are in use those which are deprecated are omitted from the body of the text but are entered in the alphabetical index with a cross reference to the standard term. In cases where it was felt that the time was not yet right to deprecate a synonym, preferred terms are given first and other terms are printed in less prominent type to indicate the intention to

* BS 205, 'Glossary of terms used in electrical engineering'.

† BS 204, 'Glossary of terms used in telecommunication (including radio) and electronics'.

‡ BS 233, 'Glossary of terms used in illumination and photometry'.

§ BS 1611, 'Glossary of colour terms used in science and industry'.

deprecate them in the course of time. Where synonyms are considered of equal value they are shown in the same type.

Where terms are used with somewhat different meanings in different branches of electrical engineering, appropriate definitions are given in the groups of the glossary corresponding to these branches. Such a definition, when taken out of the context of its group, should always be quoted with a preamble indicating its proper context.

It is to be noted that the given definition of a term represents the generally accepted meaning of that term. Under no circumstances should it be regarded as taking the place of a specification.

An effort has been made to arrange the terms in a logical order proceeding from the general to the specific and from the whole to the part and placing allied terms in proximity within a subsection or section of the group. Each term has assigned to it a Part number (one digit) and a Group number of two digits followed by a space and four digits, the first digit of which represents the section, the second digit the subsection and the last two digits the place within the subsection.

A general view of the arrangement of the group in the glossary can be obtained from the Guide to the Glossary. An alphabetical index of the terms of the group is provided at the end to facilitate reference to particular terms. For simplicity, only the last four digits of a term's number are quoted in the index. It is recommended that the user of any group of the glossary should consider the group in association with the groups covering general or fundamental terms within the Part for Parts 2 and 3, and also together with Groups 01 and 02 of Part 1.

In this glossary round brackets () enclose words or phrases which are not part of the term or definition and can be omitted without affecting the meaning.

Square brackets [] enclose words which may replace a preceding part of an expression. The limiting sign ┌ indicates, if necessary, how many of the preceding words are replaced.

203 1 MACHINES**203 11 General**

No.	Term	Definition
203 1101	(electrical) rotating machine	An electrical apparatus depending on electromagnetic induction for its operation and having components capable of relative rotary movement and intended for converting energy. NOTE. This term also applies to electrical apparatus operating on the same principle and similar in construction and intended for other purposes, e.g. regulation, and is not intended to cover electrostatic machines.
203 1102	homopolar machine	A machine in which the magnetic flux passes in the same direction from one member to the other over the whole of a single air gap area.
203 1103	heteropolar machine	A machine having successive physical or effective poles of opposite polarity.
203 1104	direct current commutator machine	A direct current machine incorporating an armature winding connected to a commutator and magnetic poles which are excited from a direct current source or which are permanent magnets.
203 1105	synchronous machine	An alternating current machine in which the frequency of the generated voltage and the speed of the machine are in a constant ratio.
203 1106	asynchronous machine	An alternating current machine in which the speed on load and the frequency of the system to which it is connected are not in a constant ratio.
203 1107	double-fed asynchronous machine	An asynchronous machine of which the stator winding and the rotor winding are fed by supply frequencies both of which may be either constant or variable.
203 1108	induction machine	An asynchronous machine comprising a magnetic circuit interlinked with two or more electric circuits moving relative to one another and in which power is transferred from one circuit to another by electromagnetic induction. NOTE. In many countries this term is practically synonymous with 'asynchronous machine' whereas some others recognize only the term 'asynchronous machine' for both concepts.
203 1109	alternating current commutator machine	An induction machine having an armature winding connected to a commutator.
203 1110	inductor machine	A synchronous machine in which one member, usually stationary, carries main and exciting windings effectively disposed relative to each other, and in which the other member, usually rotating, is without windings but carries a number of regular projections. Permanent magnets may be used instead of the exciting winding.
203 1111	single-phase machine	A machine which generates or utilizes single-phase alternating current.
203 1112	polyphase machine	A machine which generates or utilizes polyphase alternating current.
203 1113	salient pole machine	A machine in which the field poles project from the yoke or hub towards the air-gap.
203 1114	cylindrical rotor machine	A machine having a cylindrically-shaped rotor the periphery of which may be slotted, and which may accommodate the coil sides of a winding.
203 1115	conical rotor machine	A machine in which the rotor is in the shape of a frustum of a cone.
203 12	Generators	
203 1201	generator	A machine which converts mechanical power into electrical power.
203 1202	direct current generator	A generator for the production of direct current and voltage.
203 1203	alternating current generator	A generator for the production of alternating current and voltage.

No.	Term	Definition
203 1204	synchronous generator	A synchronous machine for use as a generator.
203 1205	turbine-type alternating current generator	An alternating current generator designed for high-speed operation and having an exciting winding embedded in a cylindrical steel rotor made from forgings or thick discs. NOTE. In English usage, 'turbo-generator' ('turbo-alternator' is deprecated) would designate the complete turbine and generator set.
203 1206	double-wound synchronous generator	A synchronous generator which has two similar primary windings mounted on the same magnetic structure but not necessarily connected electrically either within or outside the machine.
203 1207	induction generator	An induction machine when driven above synchronous speed by an external source of mechanical power.
203 1208	inductor generator	An inductor machine for use as a generator.
203 1209	permanent magnet generator	A generator in which the no-load magnetic flux is provided by one or more permanent magnets.
203 1210	exciter	A generator which supplies all or part of the power required for the excitation of an electrical machine. NOTE. Exciters may be d.c. or a.c. machines.
203 1211	main exciter	An exciter which supplies all or part of the power required for the excitation of the principal electrical machine or machines.
203 1212	pilot exciter	An exciter which supplies all or part of the power required for the excitation of another exciter.
203 13	<i>Motors</i>	
203 1301	motor	A machine which converts electrical power into mechanical power. NOTE. Terms 203 1302 to 203 1333 inclusive represent a classification of motors according to the methods of supply, excitation and the arrangement of the magnetic circuit.
203 1302	universal motor	A motor which can be operated by either direct current or single phase alternating current of normal supply frequencies.
203 1303	direct current motor	A motor for operation by direct current.
203 1304	alternating current motor	A motor for operation by alternating current.
203 1305	synchronous motor	A synchronous machine for use as a motor.
203 1306	solid pole synchronous motor	A salient pole synchronous motor having solid steel pole shoes.
203 1307	cage synchronous motor	A salient pole synchronous motor having a cage winding embedded in the pole shoes.
203 1308	synchronous induction motor	A cylindrical rotor synchronous motor having a secondary coil winding similar to that of a wound rotor induction motor. This winding is used for both starting and excitation purposes.
203 1309	salient pole synchronous induction motor	A salient pole synchronous motor having a coil winding for starting purposes embedded in the pole shoes. The terminal leads of this coil winding are connected to collector rings.
203 1310	inductor type synchronous motor	An inductor machine running as a motor, the torque being produced by forces between the stationary poles and salient rotor teeth.
203 1311	permanent magnet synchronous motor	A synchronous motor with a cylindrical rotor similar to a cage induction motor in which the member carrying the secondary laminations and windings carries also permanent magnet field poles that are shielded from the alternating flux by the laminations. It starts as an induction motor but operates normally at synchronous speed.

No.	Term	Definition
203 1312	reluctance motor	A synchronous motor in which the secondary member has projections acting as salient poles without an excitation winding or permanent magnets. It is normally provided with a cage winding for starting as an induction motor.
203 1313	subsynchronous reluctance motor	A reluctance motor in which the number of projections acting as salient poles is greater than the number of the poles formed by the primary winding, this causing the motor to operate at a constant average speed which is a sub-multiple of its apparent synchronous speed.
203 1314	induction motor	An induction machine for use as a motor.
203 1315	cage induction motor	An induction motor in which a primary winding on one member, usually the stator, is connected to the power source, and a secondary cage-winding on the other member, usually the rotor, carries induced current.
203 1316	wound-rotor induction motor	An induction motor in which a primary winding on one member, usually the stator, is connected to the power source, and a secondary polyphase coil-winding, on the other member, usually the rotor, carries induced current. NOTE. The terminal leads of the rotor windings are short-circuited for the running condition. Unless otherwise specified, this motor will usually have collector rings.
203 1317	brushless wound-rotor induction motor	A wound-rotor induction motor in which the ends of the secondary winding are directly connected with an incorporated starting device.
203 1318	hysteresis motor	A synchronous motor with a smooth cylindrical rotor of magnetic material, preferably of hard retentivity and without direct current excitation, which starts by virtue of the hysteresis losses induced in its secondary member by the rotating field of the primary and operates normally at synchronous speed due to the retentivity of the secondary core.
203 1319	shaded pole motor	A single-phase induction motor having one or more auxiliary short-circuited windings displaced in magnetic position from the main winding, all these windings being on the primary core, usually the stator.
203 1320	split phase motor	A single-phase induction motor having an auxiliary primary winding, displaced in magnetic position from and connected in parallel with the main primary winding. There is a phase displacement between the currents in these two windings. NOTE. Unless otherwise specified, the auxiliary circuit is assumed to be opened when the motor has attained an appropriate speed.
203 1321	resistance start split phase motor	A split phase motor having a resistance connected in series with the auxiliary primary winding. NOTE. The auxiliary circuit is opened when the motor has attained an appropriate speed.
203 1322	reactor start split phase motor	A split phase motor designed for starting with a reactor normally in series with the main primary winding. NOTE. The auxiliary primary circuit is opened and the reactor is short-circuited or otherwise made ineffective when the motor has attained an appropriate speed.
203 1323	capacitor motor	A split phase motor with a capacitor normally in series with the auxiliary primary winding.
203 1324	capacitor start motor	A capacitor motor in which the auxiliary primary winding connected in series with a capacitor is in circuit only during the starting period.
203 1325	capacitor start and run motor	A capacitor motor in which the auxiliary primary winding and series connected capacitor remain in circuit for both starting and running.
203 1326	two-value capacitor motor	A capacitor motor using different values of capacitance for starting and running.

No.	Term	Definition
203 1327	alternating current commutator motor	An alternating current motor having an armature winding connected to its commutator and included in an alternating current circuit.
203 1328	schrage motor	A polyphase commutator motor with shunt characteristic, in which the rotor carries two windings, one of the windings receiving current from the supply by means of collector rings while the other is connected to the commutator. The commutator carries two adjustable sets of brushes and supplies each of the separate phases on the stator with adjustable voltages, in order to obtain a variation of speed and of the reactive power taken from the supply.
203 1329	repulsion motor	A single phase induction motor with a primary winding, generally on the stator, connected to the power source, and a secondary winding, generally on the rotor, connected to a commutator the brushes of which are short-circuited and can occupy different positions.
203 1330	deri motor	A repulsion motor having two sets of brushes of which one set is fixed and the other movable.
203 1331	compensated repulsion motor	A repulsion motor in which the primary winding on the stator is connected in series with the rotor winding via a second set of brushes on the commutator in order to improve the power factor and commutation.
203 1332	repulsion start induction motor	A repulsion motor in which the commutator bars are short-circuited or otherwise connected at an appropriate speed to give the equivalent of a cage winding.
203 1333	repulsion induction motor	A repulsion motor with an additional rotor cage winding. NOTE. Terms 203 1334 to 203 1349 inclusive represent a classification of motors according to their application and variability of speed.
203 1334	general purpose motor	Any motor designed, listed and offered in standard ratings with operating characteristics and mechanical construction suitable for use under usual service conditions without restrictions to a particular application or type of application.
203 1335	definite purpose motor	A motor designed, listed and offered in standard ratings with operating characteristics and mechanical construction suitable for a particular type of application.
203 1336	special purpose motor	A motor with special operating characteristics or special mechanical construction, or both, designed for a particular application and not falling within the definitions of general purpose or definite purpose motors.
203 1337	standard dimensioned motor	A motor so dimensioned that it is mechanically interchangeable as a whole with any other motor of the same frame size and complying with the same standard specification.
203 1338	fractional horsepower motor	A motor having a continuous rating not exceeding 1 hp per 1000 rev/min.
203 1339	small-power motor	A motor having a continuous rating not exceeding a provisionally accepted limit of 1.1 kW per 1500 rev/min.
203 1340	constant speed motor	A motor the speed of which is constant or substantially constant over its normal range of loads, e.g., a synchronous motor, an induction motor with small slip or a direct current shunt motor with constant excitation.
203 1341	varying speed motor	A motor the speed of which varies appreciably with the load, ordinarily decreasing when the load increases, e.g., a series or repulsion motor.
203 1342	multi-speed motor	A motor which can be operated at any one of two or more definite speeds with a particular device connected to the motor shaft, e.g., a change-pole induction motor or a d.c. shunt motor with pre-set speed adjustment.

No.	Term	Definition
203 1343	multi-constant speed motor	A multi-speed motor whose two or more definite speeds are constant or substantially constant over its normal range of loads, e.g., an induction motor with windings capable of various pole groupings.
203 1344	multi-varying speed motor	A multi-speed motor whose two or more definite speeds, when once adjusted for a given load, will vary appreciably with change in load, e.g., a wound rotor induction motor with contactor rotor resistance.
203 1345	adjustable-speed motor	A motor the speed of which for a given range of loads can be adjusted to any value in a specified range.
203 1346	adjustable constant speed motor	An adjustable-speed motor which behaves at all speed settings as a constant speed motor, e.g., a direct current shunt motor with field resistance control designed for a specified range of speed adjustment.
203 1347	adjustable varying speed motor	An adjustable-speed motor which behaves at all speed settings as a varying speed motor, e.g., a direct current series motor with armature voltage control or wound rotor induction motor with continuously variable rotor resistance control.
203 1348	torque motor	A motor designed to exert torque through a limited movement or in a stalled position.
203 1349	starting motor	An auxiliary motor used to facilitate the starting and accelerating of a main machine to which it is mechanically connected.
203 14	<i>Special machines</i>	
203 1401	electrical dynamometer	An electrical generator or motor equipped with means for indicating torque. When used for determining power input [output] of a driving [driven] machine means for indicating speed is also provided.
203 1402	booster	A machine connected in a circuit so that its voltage either adds to or subtracts from the voltage furnished by another source.
203 1403	dynamotor	A direct current machine having a single field system, and two separate armature windings which can operate simultaneously, one as in a motor and the other as in a generator.
203 1404	direct current balancer	A combination of two or more mechanically coupled similar direct current machines used to equalize automatically the voltages between the circuits of a multiple circuit direct current system.
203 1405	synchronous compensator; synchronous condenser	A synchronous machine running without mechanical load and supplying or absorbing reactive power.
203 1406	phase advancer	A machine which supplies reactive power to the secondary of a wound rotor induction motor to improve the power factor of the latter.
203 1407	motor generator set	A set which consists of one or more motors mechanically coupled to one or more generators.
203 1408	convertor	A machine for converting one form of electrical power to a different form of electrical power.
203 1409	rotary convertor	A convertor with a single armature having a commutator and collector rings and used for converting alternating current into direct current or vice versa.
203 1410	motor convertor	The combination of an induction motor with a rotary convertor on a common shaft system, the current produced in the rotor of the motor flowing through the armature of the rotary convertor.

No.	Term	Definition
203 1411	frequency convertor	A machine which converts the power of an alternating current system from one frequency to another.
203 1412	commutator type frequency convertor	A polyphase machine, the rotor of which has one or two windings connected to collector rings and to a commutator. By feeding one set of terminals with a voltage of given frequency, a voltage of another frequency may be obtained from the other set of terminals.
203 1413	frequency changer set	A motor generator set which changes the power of an alternating current system from one frequency to another.
203 1414	induction frequency convertor	A wound rotor induction machine in which the frequency conversion is obtained by induction between a primary winding and a secondary winding rotating with respect to each other. The secondary winding delivers power at a frequency proportional to the relative speed of the primary magnetic field and the member carrying the secondary winding.
203 1415	inductor frequency convertor	A convertor having a stationary input alternating current winding, which supplies the excitation, and a stationary output winding of a different number of poles in which the generated voltage at the output frequency is induced through change in field reluctance by means of a toothed rotor.
203 1416	phase convertor	A machine for converting the power of an alternating current system having a given number of phases into a system having another number of phases but of the same frequency.
203 1417	electrical coupling	A machine which transmits torque from one shaft to another by electrical or magnetic means or in which the torque is controlled by electrical or magnetic means.
203 1418	induction coupling	An electrical coupling in which torque is transmitted by the interaction of the magnetic field produced by magnetic poles on one rotating member and induced currents in the other rotating member. NOTE 1. The magnetic poles may be produced by direct current excitation, permanent magnet excitation, or alternating current excitation. NOTE 2. The induced currents may be carried in a cage or insulated winding, or may be present as eddy currents. NOTE 3. Couplings utilizing a wound secondary winding or a cage winding are known as 'slip' or 'magnetic couplings'. Couplings utilizing eddy current effects are known as 'eddy current couplings'.
203 1419	synchronous coupling	An electrical coupling in which torque is transmitted by attraction between magnetic poles on both the driving and driven members which rotate at the same speed. NOTE. The magnetic poles may be produced by direct or alternating current excitation, or by permanent magnets. The poles on one rotating member may be produced by varying the reluctance.
203 1420	hysteresis coupling	An electrical coupling in which torque is transmitted by forces arising from the resistance to reorientation of established magnetic fields within a ferro-magnetic material.
203 1421	magnetic friction clutch	A friction clutch in which magnetic devices are used to engage or disengage the friction surfaces.
203 1422	magnetic particle coupling	An electrical coupling which transmits torque through the medium of particles of a magnetic material which conglomerate in a magnetic field between coupling members.

203 15 ***Machines for control systems***

No.	Term	Definition
203 1501	Ward-Leonard system	A method of controlling the speed and direction of rotation of a direct current motor by varying and if necessary reversing its armature voltage by the control of the field current of a direct current generator supplying the motor armature.
203 1502	Ward-Leonard generator set	A set consisting of one or more Ward-Leonard generators and a driving motor or motors.
203 1503	Ilgner generator set	A Ward-Leonard generator set which includes a flywheel to reduce the peak power input to the driving motor or motors.
203 1504	Ilgner system	A Ward-Leonard system using an Ilgner generator set.
203 1505	slip regulator	A device arranged to produce a reduction in speed below synchronous speed greater than would be obtained inherently. Such a device is usually in the form of a variable impedance connected in the secondary circuit of a wound rotor induction motor.
203 1506	Scherbius machine	A polyphase alternating current commutator machine capable of generator or motor action intended for connection in the secondary circuit of a wound rotor induction motor and used for speed and power factor control. The magnetic part of the field system is laminated and of the salient pole type and it has commutating poles and a series connected armature reaction compensating winding. The control field winding may be separately or shunt excited with or without an additional series excited field winding.
203 1507	Kraemer system	A system of speed control below synchronous speed for wound rotor induction motors giving constant power output over the speed range. Slip power is recovered through the medium of an independently mounted rotary converter electrically connected between the secondary winding of the induction motor and a direct current auxiliary motor which is directly coupled to the induction motor shaft.
203 1508	modified Kraemer system	A system of speed control below synchronous speed for wound rotor induction motors. Slip power is recovered through the medium of a converting device electrically connected between the secondary of the induction motor and a direct current auxiliary motor. The auxiliary motor may be directly coupled to the induction motor shaft or may form part of a motor generator set which can return slip power to the supply system.
203 1509	static Kraemer system	A system of speed control below synchronous speed for wound rotor induction motors. Slip power is recovered through the medium of a static converter equipment electrically connected between the secondary winding of the induction motor and a power system.
203 1510	rotary amplifier	A machine which is used to produce a power output by amplifying an input signal.
203 1511	control exciter	An exciter which acts as a rotary amplifier in a closed loop circuit.
203 16	<i>Qualifying terms</i>	
203 1601	separately excited	Applied to a machine to denote that the excitation is obtained from a source other than the machine itself.
203 1602	self excited	Applied to a machine to denote that the excitation is supplied by the machine itself.

No.	Term	Definition
203 1603	compositely excited	Applied to a machine to denote that part of the excitation is supplied by the machine itself, and part is obtained from a source other than the machine.
203 1604	shunt	Applied to a machine to denote that it is excited by a shunt winding.
203 1605	series	Applied to a machine to denote that it is excited by a series winding.
203 1606	compound	Applied to a machine to denote that it is excited by at least two windings, one of which is a series winding.
203 1607	cumulative compounded	Applied to a compound machine to denote that the magnetomotive forces of the series and other windings are in the same direction.
203 1608	differential compounded	Applied to a compound machine to denote that the magnetomotive force of the series winding is opposed to that of the other windings.
203 1609	over compounded	Applied to a compound generator to denote that the series winding is so proportioned that the terminal voltage at rated load is greater than at no load.
203 1610	level compounded	Applied to a compound generator to denote that the series winding is so proportioned that the terminal voltage at rated load is the same as at no load.
203 1611	under compounded	Applied to a compound generator to denote that the series winding is so proportioned that the terminal voltage at rated load is less than at no load.
203 1612	stabilized shunt (generator)	Applied to an under compounded generator providing a voltage drop with load such that machines may be operated in parallel without an equalizing connection.
203 1613	stabilized shunt (motor)	Applied to a compound motor with a series field winding of such proportion and polarity so as to cause a small reduction in speed with increasing load.
203 1614	self regulated	Applied to a machine having a single magnetic core structure and inherently controlling its own characteristics, such as voltage, power factor, speed, without the use of external apparatus.
203 1615	compensated regulated	Applied to a machine which, in conjunction with a separate source of excitation, can inherently regulate its own characteristics such as voltage, power factor, speed.
203 1616	automatically regulated	Applied to a machine which can regulate its own characteristics when associated with other apparatus in a suitable closed loop circuit.
203 1617	brushless	Applied to a machine in which the conventional brushgear is eliminated.
203 1618	turbine type	Applied to alternating current machines designed for high speed operation and having an excitation winding embedded in slots in a cylindrical steel rotor made from forgings or thick discs.
203 1619	inverted	Applied to a machine in which the usual functions of the stationary and revolving members are interchanged, e.g., an induction motor in which the primary winding is on the rotor and is connected to the supply through collector rings and the secondary winding is on the stator.

203 2 WINDINGS. MAGNETIC AND ELECTRICAL PARTS

203 21 *Winding arrangements*

No.	Term	Definition
203 2101	winding	An assembly of coils forming a circuit in a machine.
203 2102	primary series circuit	A circuit carrying the supply current and comprising at least one winding in a machine.
203 2103	primary winding	The principal winding in the primary series circuit.
203 2104	secondary winding	Any winding which is not a primary winding.
203 2105	main winding	The primary winding of a single phase induction machine.
203 2106	stator winding	A winding on the stator of a machine.
203 2107	rotor winding	A winding on the rotor of a machine.
203 2108	armature winding	A winding on the armature of a machine.
203 2109	damping winding	A winding which is, or can be, short-circuited, usually in the form of a cage, the purpose of which is to suppress changes in the flux linking it.
203 2110	starting winding	A winding, the purpose of which is to produce torque for starting a machine. NOTE. The term 'starting' is defined in 203 5101.
203 2111	auxiliary starting winding	A winding of a single-phase induction machine which in conjunction with the main winding is provided for starting purposes.
203 2112	excitation winding	A winding for the production of a magnetic field. NOTE. For a salient pole machine, it consists of several field coils with their interconnections. For a non-salient pole machine, it consists of several interconnected coils constituting a distributed winding.
203 2113	compensating winding	An excitation winding that carries the load current, or a current proportional thereto, and is so disposed as to oppose distortion of the magnetic field by the load current circulating in other windings. NOTE. In d.c. and generally salient-pole machines with an armature, this winding is distributed in slots in the pole shoes.
203 2114	commutating winding	An excitation winding, which, in a machine having a commutator, carries the load current, or a current proportional thereto and is so disposed as to assist the reversal of current in the coils undergoing commutation.
203 2115	control winding	An excitation winding which carries an adjustable current controlling the performance of a machine.
203 2116	shunt winding	An excitation winding consisting of coils which are connected across the whole or part of the primary series circuit of a machine. NOTE. This term is used in a.c. machines where this winding carries a current proportional to the primary voltage.
203 2117	series winding	An excitation winding consisting of coils which are connected in the primary series circuit and carrying either the whole or a proportion of the load current. NOTE. This term is used in a.c. machines where the current in this winding is proportional to the load current.
203 2118	distributed winding	A winding, the coils of which occupy several slots per pole.
203 2119	concentrated winding	A winding of a field system with salient poles or a winding the coil sides of which occupy one slot per pole.
203 2120	cage winding	A winding consisting of a number of conducting bars having their extremities connected by metal rings or plates at each end.