

Glossary of

Electrotechnical, power, telecommunication, electronics, lighting and colour terms —

Part 2: Terms particular to power
engineering —

Group 18: Electric traction

Committees responsible for this British Standard

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- Association of Consulting Engineers
- British Broadcasting Corporation
- EEA (the Association of Electronics, Telecommunications and Business Equipment Industries)
- Electricity Supply Industry in United Kingdom
- Institute of Physics
- Institution of Electrical Engineers

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Foreword

This Group of BS 4727-2 has been prepared under the direction of the General Electrotechnical Engineering Standards Policy Committee and contains terms and definitions relating to electric traction. The terms and definitions are technically identical with the corresponding terms appearing in IEC 50(811), first edition, 1991, *International Electrotechnical Vocabulary, Chapter 811: Electric traction*, published by the International Electrotechnical Commission (IEC) but the index has been expanded to facilitate location of terms.

The glossary is divided into five Parts, each of which is 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 five 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;*
- *Part 5: Terms particular to electromedical equipment.*

Fundamental and general terms common to power, telecommunications and electronics respectively form Groups 01 and 02 of Part 1. The specialist Groups, e.g. Groups 03 to 13 of Part 1, 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, e.g. 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 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 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 allied terms are placed close together. In earlier editions of BS 4727, a special numbering system was used, however to facilitate publication of future editions of BS 4727, only the International Electrotechnical Vocabulary numbering system is used. Where terms are used in other Parts of the glossary, their additional reference number is given in brackets in medium type.

A general view of the position 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 of each group to facilitate reference to particular terms. 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 and with Groups 01 and 02 of Part 1.

In this glossary parentheses () enclose words or phrases that 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.

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Summary of pages

This document comprises a front cover, an inside front cover, pages i to vi, pages 1 to 58 and a back cover.

This standard has been updated (see copyright date) and may have had amendments incorporated. This will be indicated in the amendment table on the inside front cover.

Guide to the glossary

Part 1 Terms common to power, telecommunications and electronics

Group 01	Fundamental terminology
Group 02	Electrical and magnetic devices terminology
Group 03	Relay terminology
Group 04	Measurement terminology
Group 05	Semiconductor terminology
Group 06	Electronic tube terminology
Group 07	Magnetic materials and components
Group 08	Piezoelectric devices for frequency control and selection
Group 09	Electromagnetic compatibility
Group 10	Insulating solids, liquids and gases
Group 11	Printed circuits
Group 12	Insulators
Group 13	Electromechanical components for electronic equipment

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

Part 2 Terms particular to power engineering

Group 01	General power terminology (<i>withdrawn</i>)
Group 02	Power electronics terminology
Group 03	Rotating machinery terminology
Group 04	Power transformers and reactors
Group 05	Voltage fluctuation terminology
Group 06	Switchgear and controlgear terminology (including fuse terminology)
Group 07	Tariffs terminology
Group 08	Electric cable terminology
Group 09	Transducer terminology
Group 10	Industrial electroheating terminology
Group 11	Generation, transmission and distribution of electricity terminology
Group 12	Telecontrol
Group 13	Electrical apparatus for explosive atmospheres
Group 14	Power capacitors
Group 15	Overhead lines
Group 16	Instrument transformers
Group 17	Secondary cells and batteries
Group 18	Electric traction

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

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
Group 08	Acoustics and electro-acoustics terminology

- Group 09 Transmission lines and waveguides
- Group 10 Recording and reproduction of sound and video terminology
- Group 11 Space radiocommunications terminology
- Group 12 Telecommunications channels and networks

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

Part 4 Terms particular to lighting and colour (*withdrawn*)

Part 5 Terms particular to electromedical equipment

- Group 01 Radiology and radiological physics terminology

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

No.	Term	Definition
811-01 General terms		
811-01-01	electric traction	A traction system in which electric energy is supplied to traction motors.
811-01-02	d.c. traction	A traction system in which electric energy is supplied to motor vehicles from external direct current sources.
811-01-03	single-phase a.c. traction	A traction system in which electric energy is supplied to motor vehicles from external single-phase alternating current sources. NOTE The single-phase current supplied to the motor vehicle may be either at the frequency of the national distribution system (industrial frequency) or at the particular frequency of the railway system (special frequency).
811-01-04	three-phase a.c. traction	A traction system in which electric energy is supplied to motor vehicles from external three-phase alternating current sources.
811-01-05	thermo-electric traction	A traction system in which the energy supplied by prime movers on motor vehicles is electrically transmitted to the driving axles.
811-01-06	battery-electric traction	A traction system in which the energy is supplied by electric batteries carried on the motor vehicle or a trailer.
811-01-07	stored kinetic energy traction	A traction system in which the energy is supplied by flywheels carried on the motor vehicle or a trailer.
811-02 Types of vehicles		
811-02-01	rolling stock	A general term covering all vehicles with or without motors.
811-02-02	vehicle	A general term denoting any single item of rolling stock, e.g. a locomotive, a coach or a wagon.
811-02-03	motor vehicle	A general term denoting any vehicle fitted with one or more traction motors.
811-02-04	traction unit	A general term denoting a locomotive, motor-coach or train-unit.
811-02-05	traction fleet	A general term covering all the traction units belonging to a particular railway or other administration.
811-02-06	locomotive	A motor vehicle intended to move other vehicles and not carrying a payload nor forming part of a train-unit.
811-02-07	motor coach; motor car	A railway motor vehicle, generally electric, itself carrying a payload.
811-02-08	motor luggage van; motor baggage car (USA)	A motor coach specially fitted for the conveyance of parcels and luggage or baggage.
811-02-09	(motor) train-unit	A group of vehicles including at least one motor vehicle and forming the smallest self-contained unit, indivisible in service, of a multiple-unit train.
811-02-10	trailer	A vehicle without motors, forming part of a train unit.
811-02-11	non-driving motor vehicle	A motor vehicle without a driver's cab.

No.	Term	Definition
811-02-12	multiple unit train; (reversible) motorcoach train	A train comprising one or more train units which can be controlled simultaneously from one cab and able to operate at normal speed in either direction without re-marshalling.
811-02-13	articulated unit	A group of vehicles in which the adjacent ends of adjoining vehicles are carried on a common bogie.
811-02-14	driving trailer; control trailer	A trailer provided with a driver's cab from which it is possible to drive the train-unit or push-pull train of which the trailer forms part.
811-02-15	power car	A term applied to the motor vehicles of some types of diesel or electric train unit. NOTE In French, the term "motrice" is also used to designate the motor car on a tramway system.
811-02-16	push-pull train	A train generally having a locomotive at one end and a driving trailer at the other, able to operate at normal speed in either direction without re-marshalling.
811-02-17	shunting locomotive	A locomotive designed for shunting service.
811-02-18	hump locomotive	A shunting locomotive designed to propel trains over the hump in a hump shunting yard.
811-02-19	industrial locomotive	A locomotive used on a private siding (factory siding, etc.) and not necessarily having all the safety devices provided on main-line locomotives.
811-02-20	small-power locomotive	A motor vehicle of low output intended for minor shunting operations or for moving light trains.
811-02-21	mine locomotive	A locomotive used in mine galleries or in underground installations.
811-02-22	barge tractor	A motor vehicle intended for hauling ships or barges on canals.
811-02-23	twin motor vehicle	A traction unit made up of two motor vehicles coupled together, no one of which can run separately in normal service.
811-02-24	triple motor vehicle	A traction unit made up of three motor vehicles coupled together, no one of which can run separately in normal service.
811-02-25	d.c. motor vehicle	A motor vehicle to which electric power is supplied from an external source of direct current.
811-02-26	single-phase a.c. motor vehicle	A motor vehicle to which electric power is supplied from an external source of single-phase alternating current.
811-02-27	three-phase a.c. motor vehicle	A motor vehicle to which electric power is supplied from an external source of three-phase alternating current.
811-02-28	dual voltage motor vehicle	A motor vehicle to which electric power may be supplied by one or other of two external sources of the same current type and frequency but of different voltages.
811-02-29	dual frequency motor vehicle	A motor vehicle to which electric power may be supplied by one or other of two external sources of alternating current of different frequencies.
811-02-30	dual system motor vehicle	A motor vehicle to which electric power may be supplied by one or other of two external sources of different current types.

No.	Term	Definition
811-02-31	multi-system motor vehicle	A motor vehicle to which electric power may be supplied from more than two external sources of different current type, voltage or frequency, any one of which may be selected.
811-02-32	diesel-electric motor vehicle	A motor vehicle obtaining traction power from a diesel engine and d.c. generator or alternator carried on the vehicle.
811-02-33	turbine motor vehicle (electric transmission)	A motor vehicle obtaining traction power from a turbine and d.c. generator or alternator carried on the vehicle.
811-02-34	rack motor vehicle	A motor vehicle on which all or part of the tractive effort is transferred by means of gearing to a rack fitted between the rails.
811-02-35	coupled-axle locomotive	A locomotive in which certain axles are coupled mechanically, in rotary motion, in one or more groups.
811-02-36	individual axle drive locomotive	A locomotive in which the driving axles are not mechanically coupled in rotary motion.
811-02-37	magnetically supported vehicle; maglev	A vehicle which, in normal service, does not roll on wheels, but is supported and guided by magnetic forces.
811-02-38	air-cushion vehicle	A vehicle which, in normal service, does not roll on wheels, but is supported and guided by streams of low pressure compressed air produced on the vehicle.
811-02-39	inertia storage vehicle (by a flywheel)	A vehicle using the energy stored in a flywheel for its propulsion.
811-02-40	battery-electric road vehicle	An electrically powered road vehicle to which the energy is supplied from a battery carried on the vehicle.
811-02-41	(electric) tramcar; street-car (USA)	A motor vehicle running alone or with trailers on tracks of which the rails are often embedded in the public highway.
811-02-42	(electric) tramway	A transport system using motor vehicles running on rails embedded in the public highway or on an independent route.
811-02-43	trolleybus	1) An electrically driven pneumatic-tyred vehicle running without rails on public roads, alone or with a trailer, and drawing its power from an overhead contact line. 2) A transport system using trolleybuses.
811-02-44	driver's cab	A part of a vehicle used for driving the vehicle or train, forming a separate compartment.
811-02-45	driving position	A part of vehicle used for driving the vehicle or train, not in a separate compartment.
811-02-46	shunting control position	A driving position for use in shunting operations.
811-02-47	guard's position	A part of the vehicle containing controls used by the guard, e.g. heating, lighting and door controls, emergency brake.

811-03 Traffic and train loads

811-03-01	traffic	The total data defining the amount of traffic running over one or more lines during a certain period. The distance covered or the combined distance covered and load conveyed may be taken into consideration.
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NOTE The amount of traffic is generally expressed in train-miles, ton-miles, train-kilometres, tonne-kilometres or passenger-kilometres.

No.	Term	Definition
811-03-02	total gross traffic	The product of the length of a journey and the total gross load, including motor vehicles, run over that distance during a certain period.
811-03-03	gross traffic hauled	The product of the length of a journey and the gross load hauled over that distance during a certain period.
811-03-04	net traffic	The product of the length of a journey and the payload conveyed over that distance during a certain period.
811-03-05	payload (of a train)	The total mass of the passengers, luggage and goods in the train.
811-03-06	normal load (of a train unit)	The specified total mass of passengers and luggage, on which the performance of the train unit in normal service is based.
811-03-07	crush load (of a train unit)	The maximum mass of passengers and luggage which can be safely accommodated in the train unit. It may reduce the performance.
811-03-08	(gross) load hauled; trailing road	The mass of all the vehicles hauled, including their loads.
811-03-09	total gross load (of a train)	The total of the gross load hauled and the mass of the motor vehicles which haul it.
811-03-10	normal load of a motor vehicle	The trailing load which can be hauled by one or more motor vehicles over a given route whilst observing a specified schedule.
811-03-11	maximum load of a motor vehicle	The maximum load which can be safely hauled by one or more motor vehicles over a given route. It may reduce the performance.

811-04 Methods of use

811-04-01	empty running	The running of a motor coach or a train unit without passengers or luggage.
811-04-02	light running; locomotive running light	The running of a locomotive not coupled to a train.
811-04-03	coasting	The free running of a train with no traction current and no brakes applied.
811-04-04	assisted operation	Operation in which the train is worked by two or more motor vehicles, each driven by its own crew.
811-04-05	double heading	Assisted operation in which two motor vehicles are placed at the front of the train.
811-04-06	banking; assisting in rear; pusher operation (USA)	Running in which a motor vehicle, coupled or uncoupled, is added to the rear of a train to assist in its propulsion.
811-04-07	multiple unit operation	Operation in which several motor vehicles are operated from one driver's cab or driving position.
811-04-08	propelling movement	Running in which the motor vehicle, coupled or not and with its crew, is located at the rear of the train and pushes it.
811-04-09	push-pull operation	A method of operation in which a motor vehicle is coupled to one end of the train and pushes or pulls it, the driver being always located in a driver's cab at the head of the train.

No.	Term	Definition
811-04-10	radio control	The transmission by radio of driving control signals for one or more motor vehicles, either from a driver's cab at the head of a train or from a fixed location.
811-04-11	driving	All the operations carried out on the traction and brake control equipment to start the vehicle or train, control its speed and brake it.
811-04-12	manual operation	A method of driving in which the controls have to be operated by a driver on the train or vehicle.
811-04-13	automatic train operation	A method of operation in which the movement of the train is automatically controlled without the intervention of a driver, who, if provided, exercises only a supervisory function.
811-04-14	single-manning	A method of operation in which the driver's cab is occupied by only one man who carries out all the driving operations.
811-04-15	one man operation; one person operation	A method of use of a train in which all the driving and other operational duties (e.g. control of doors, heating, lighting) are performed by only one man.

811-05 Train movement

811-05-01	total (train) resistance	The sum of the forces opposing the movement of a train or vehicle.
811-05-02	specific train resistance	The resistance to motion per unit mass of a vehicle or train.
811-05-03	specific rolling resistance	The specific resistance due to friction between wheel and rail and between other moving parts, on straight and level track.
811-05-04	specific resistance due to curves	The specific resistance due to the component of rolling friction produced in curves.
811-05-05	specific air resistance	The specific resistance due to the effect of air pressure on the front of the train and of air friction on the sides, top, bottom, etc.
811-05-06	specific resistance on inclined track (gradient)	The specific resistance due to the component of gravitational force on a given gradient. NOTE If the slope is downward in the direction of travel the value will be negative.
811-05-07	allowance for rotating parts	A factor greater than unity applied to the mass of a train or vehicle to make allowance for the inertia of the revolving masses inseparable from the movement of the train (wheel-sets, rotors, etc.).
811-05-08	breakaway force	Maximum resistance immediately before all the train wheels begin to turn.
811-05-09	accelerating force	That part of the force at the wheel rim available to accelerate the masses of the train in both longitudinal and rotary movement.
811-05-10	decelerating force; retarding force	The force available to decelerate the masses of the train in both longitudinal and rotary movement.
811-05-11	residual acceleration	The acceleration which, for a given speed, corresponds to the difference between the available tractive effort and the tractive effort necessary to maintain that speed.
811-05-12	starting	The first part of the accelerating period, during which the equipment may work under short-time conditions of overload.

No.	Term	Definition
811-06 Braking		
811-06-01	braking system	A set of equipment fitted on vehicles to hold or reduce speed or to stop a vehicle or train.
811-06-02	brake type	A term indicating how the braking force is produced: electrodynamic, electromagnetic, mechanical, etc.
811-06-03	combined braking system	Combination of different brake types.
811-06-04	composite braking system	A braking system comprising more than one brake type, operated manually or automatically, separately or together.
811-06-05	blended braking	Composite braking in which the forces produced by two or more of the component brake types are automatically controlled to provide the total force required at any instant.
811-06-06	substitutional braking	Composite braking in which the force produced by one brake type is automatically eliminated in order to be replaced by that of one or more others.
811-06-07	holding brake	A method of operating the braking system to maintain an approximately uniform speed when descending long gradients.
811-06-08	retarding brake	A method of operating the braking system to reduce speed without bringing the train to a standstill.
811-06-09	stopping brake	A method of operating the braking system to bring a train completely to a standstill.
811-06-10	automatic spot brake	A braking system which brings a train or a vehicle to a standstill at a predetermined point, regardless of its initial speed and without the need for a driver to control the brake force.
811-06-11	emergency brake	1) A means of actuating the brakes on a train or vehicle as rapidly as possible, initiated by the driver or independently. 2) An alternative braking system for use in the event of failure of the normal system.
811-06-12	parking brake	A brake provided to hold a vehicle stationary and which remains applied independent of any source of power on the vehicle. It may be operated, in application or release, electrically, hydraulically, by spring or by hand.
811-06-13	anti-slip brake	A means of controlling the slipping of a wheelset by a light application of the air brake or other brake.
811-06-14	mechanical braking	A brake type whose braking force is provided by friction between brake blocks or pads and the wheels or separate discs.
811-06-15	(compressed) air brake	A mechanical brake in which the friction members are actuated by compressed air and controlled by varying the air pressure.
811-06-16	vacuum brake	A mechanical brake in which the friction members are actuated by a controlled variable vacuum acting against a relatively constant higher vacuum.
811-06-17	handbrake	A brake type in which the friction members are actuated by hand through purely mechanical means.

No.	Term	Definition
811-06-18	electrically released spring brake	A mechanical brake in which the actuating force is provided by a metallic spring, so arranged that the brake is released by the force of the spring being overcome by a device powered by electricity.
811-06-19	electro-magnetic braking	A brake type using electro-magnets to produce a braking force.
811-06-20	electro-magnetic friction braking	Electro-magnetic braking in which the electro-magnet acts on a shoe, block or pad applied to the rail or to a rotating part (wheel, disc, drum, etc.).
811-06-21	electro-magnetic track brake; electro-magnetic rail brake	Electro-magnetic friction braking in which the electro-magnets are applied directly to the rails.
811-06-22	solenoid braking	Electro-magnetic braking in which a mechanical brake, acting on the wheels or on discs, is operated by electro-magnets.
811-06-23	electric braking	A brake type in which electric energy is generated.
811-06-24	electro-dynamic braking	Electric braking in which the energy is generated by the traction motors driven by the vehicle and acting as generators.
811-06-25	regenerative braking	Electro-dynamic braking in which the energy produced by the motors is fed into the line or into energy storage devices (batteries, flywheels, etc.).
811-06-26	resistance braking rheostatic braking deprecated	Electro-dynamic braking in which the energy produced by the motors is dissipated in resistors.
811-06-27	electro-dynamic braking independent of line supply	Electro-dynamic braking in which the braking effort is available even when the traction supply system is not energized.
811-06-28	electro-dynamic braking dependent of line supply	Electro-dynamic braking in which the braking effort is available only when the traction supply system is energized.
811-06-29	electric induction braking	Electric braking in which the braking force is produced by induction in a conducting linear body (rail, etc.) or in a rotating part (wheel, disc, drum, etc.).
811-06-30	brake control	The means by which the driver or automatic driving system regulates the operation of the braking system.
811-06-31	electro-pneumatic brake control	A system where valves on each vehicle are operated electrically from the driver's cab and control the admission or release of compressed air to or from the brake cylinders.
811-06-32	electro-vacuum brake control	A vacuum brake control in which atmospheric air is admitted to the brake cylinders through a valve or valves on each vehicle, controlled electrically from the driver's cab.
811-06-33	automatic load compensation	A method of varying the brake force produced at any given step of braking so that it is proportional to the mass of the vehicle, including any load which it may be carrying.
811-06-34	electrically controlled brake	A braking system in which a friction brake is controlled purely by electrical means, e.g. a stalled motor compressing a spring to a degree governed by the motor current.
811-06-35	brake force; braking force	The retarding force exerted on a vehicle or train by its braking system.

No.	Term	Definition
811-06-36	holding brake force	The braking force exerted by the holding brake to maintain constant speed while descending a gradient.
811-06-37	braking characteristic	The relationship between the braking force and the speed.
811-06-38	stable characteristic; natural stability	A characteristic of an electric braking system in which the brake force is approximately constant or increases with increasing speed without the need for adjustment manually or by an automatic device.
811-06-39	unstable characteristic	A characteristic of an electric braking system in which the braking force for a given setting of the controls varies inversely with the speed of the train.
811-06-40	critical speed in resistance braking critical speed in rheostatic braking <i>deprecated</i>	The minimum speed at which rheostatic braking can be established under specified conditions.
811-06-41	mean deceleration (as a function of time)	The value of deceleration γ_a obtained by dividing the reduction in speed by the time taken to effect it: $\gamma_a = \frac{V_i - V_f}{t}$ where V_i is the initial speed measured at the moment of the operation of the control device for the brake; V_f is the final speed obtained at the end of the braking; t is the time between the moment of operation of the control device for the brake and the moment at which the final speed is attained.
811-06-42	effective deceleration (as a function of distance)	The value of deceleration γ_a obtained by dividing the difference of the squares of the initial and final speeds by twice the distance travelled while the reduction of speed is taking place: $\gamma_e = \frac{V_i^2 - V_f^2}{2l}$ where l is the distance between the position of the train or vehicle at the moment of the operation of the brake control and its position when the final speed is attained; V_i is the initial speed measured at the moment of operation of the control device for the brake; V_f is the final speed obtained at the end of the braking.
811-06-43	stopping distance	The distance travelled by a train or vehicle between the point at which application of the brake is initiated and that at which the train comes to a standstill.
811-06-44	response time (of braking)	The time between the moment of operation of the brake control and the moment the brake force has attained a specified value at a given speed.

No.	Term	Definition
811-06-45	braking response	A diagram of braking force variation as a function of time from the moment of operation of the control device for the brake to the moment the braking force has effectively attained a specified value.
811-06-46	magnet valve; electro-pneumatic valve	An electrically operated valve which controls a compressed-air or vacuum line.
811-06-47	variable magnet valve	A form of magnet valve in which the pressure of the compressed air delivered by the valve is directly or inversely proportional to the current flowing in the solenoid.
811-06-48	anti-slip magnet valve	A magnet valve used to control the anti-slip brake.
811-06-49	pressure switch	A switch in which the contacts are operated at a predetermined liquid or gas pressure.

811-07 Adhesion

811-07-01	adhesion	The friction between the wheels of a vehicle and the rails, which makes possible the transmission of tractive effort and braking force.
811-07-02	factor of adhesion coefficient of adhesion <i>deprecated</i>	The limiting ratio of the tangential and normal forces at the point of contact between wheel and rail. NOTE The values of this factor are different for traction and braking.
811-07-03	anti-slip device	A device which corrects slipping of driving wheels during traction.
811-07-04	wheel slide protection device	A device which corrects skidding or locking of any wheels during braking.
811-07-05	weight transfer	A change in the static load of an axle on the rails, due to the application of tractive or braking effort. NOTE It may be expressed as an absolute or relative value.
811-07-06	weight transfer compensation device	A device to compensate for the effect of weight transfer, either by transferring weight from one axle to another or by modifying the tractive effort on certain axles.
811-07-07	creep	A condition under which a wheel producing tractive or braking effort rotates slightly faster or slower than that required by the speed of the vehicle. NOTE The value may be expressed either in percentage or in absolute terms.

811-08 Riding quality

811-08-01	riding quality	A qualitative or quantitative indication of the body or bogie movements of a vehicle travelling along the rails. NOTE The body and bogies of a moving vehicle may be affected by linear and rotational disturbing movements which are defined by reference to a set of three mutually perpendicular axes, one along the track (longitudinal direction), one across it (transverse direction) and one vertical (perpendicular to the track surface).
811-08-02	fore-and-aft oscillation	A linear disturbing movement along the track.
811-08-03	lateral oscillation	A linear disturbing movement across the track.
811-08-04	bouncing	A vertical disturbing movement.

No.	Term	Definition
811-08-05	nosing; hunting	A rotary disturbing movement about the vertical axis.
811-08-06	pitching; galloping	A rotary disturbing movement about the transverse axis.
811-08-07	rolling; swaying	A rotary disturbing movement about the longitudinal axis.

811-09 Gauges

811-09-01	gauge	Cross-sectional dimensions defining the maximum permitted dimensions of vehicles or the minimum dimensions of fixed structures. NOTE More detailed definitions concerning gauges are given in the publications of the International Union of Railways.
811-09-02	conductor rail gauge	A contour which contains all the cross sections of the contact rail, the insulators, supports and safety devices above rail level, allowance being made for clearances around live parts.
811-09-03	pantograph clearance gauge	A contour beyond which has to be placed any fixed structure above vehicle roof level, to allow any pantograph in use to pass safely, making allowance for lateral displacement of the pantograph and for passing electrical clearances.
811-09-04	electrification clearance gauge	A contour which contains the various live parts of an overhead contact line, allowance being made for static electrical clearances, and from which all other fixed objects has to be kept clear.
811-09-05	electrical clearance (of contact line)	The minimum distance permitted between fixed structures and parts energized at contact line voltage.

811-10 Test categories

811-10-01 (151-04-20)	acceptance test	A contractual test to prove to the customer that the device meets certain conditions of its specification.
811-10-02	running test	A test carried out on a motor vehicle running on the railway.
811-10-03	stationary test	A test carried out on the test-bed or on a stationary vehicle.
811-10-04 (151-04-15)	type test	A test of one or more devices made to a certain design to show that the design meets certain specifications.
811-10-05 (151-04-16)	routine test	A test to which each individual device is subjected during or after manufacture to ascertain whether it complies with certain criteria.
811-10-06 (151-04-17)	sampling test	A test on a number of devices taken at random from a batch.
811-10-07	investigation test	A special test of an optional character carried out in order to obtain additional information.

No.	Term	Definition
811-11 Performance of electric motor vehicles		
811-11-01 (151-04-01)	nominal value	A suitable approximate quantity value used to designate or identify a characteristic of a component, device or equipment.
811-11-02 (151-04-03)	rated value	A quantity value assigned, generally by a manufacturer, for a specified operating condition of a component, device or equipment.
811-11-03 (151-04-04)	rating	The set of rated values and operating conditions.
811-11-04	rating of an electric vehicle	The rating or, where appropriate the sum of ratings, of the machines or other apparatus which limit the performance of the vehicle in a specified operating condition.
811-11-05	continuous rating	The combination of rated values at which the vehicle, machine or apparatus is able to operate continuously without exceeding for any part the specified limits of temperature rise.
811-11-06	short-time rating	The combination of rated values at which the vehicle, machine or apparatus is able to operate for a specified short time without exceeding for any part the specified limits of temperature rise. NOTE If the specified time is 1 h, the rating is called the one-hour rating.
811-11-07	intermittent rating	A combination of rated values at which the vehicle, machine or apparatus is able to operate when on a specified duty with on-load intervals alternating with off-load intervals without exceeding for any part the specified limits of temperature rise.
811-11-08	continuous (quantity)	The value of an electrical or mechanical quantity (output, current, speed, tractive effort, torque, etc.) corresponding to the continuous rating of the machine or vehicle with half-worn wheels and at full field or other specified field value.
811-11-09	short-time (quantity)	The value of an electrical or mechanical quantity (output, current, speed, tractive effort, torque, etc.) corresponding to the short-time rating of the machine or vehicle with half-worn wheels and at full field or other specified field value.
811-11-10	balancing speed	The speed of a vehicle or train at which the applied tractive effort and the total resistance to motion are equal.
811-11-11	average speed between stops	The quotient of the distance between two or more stops by the time taken to cover this distance, excluding stationary time.
811-11-12	schedule speed	The quotient of the distance between two or more stops by the time taken to cover this distance, including stationary time.
811-11-13	maximum speed (of a vehicle)	The maximum speed allowable for a vehicle running in normal service. NOTE This speed, inherent in the vehicle, is limited by factors such as the stability and mechanical strength of the parts (e.g. of the traction motors).
811-11-14	speed at end of notching	1) <i>With resistance control</i> , the speed obtained under given conditions when all resistance is cut-out. 2) <i>With transformer voltage control</i> , the speed obtained under given conditions when full traction motor supply voltage is reached.

No.	Term	Definition
811-11-15	base speed	With chopper control, the speed obtained under given conditions when full traction motor supply voltage is reached.
811-11-16	speed restriction	The maximum speed authorized over a particular length of track limited by factors such as the construction or condition of the track and the type of signalling. NOTE It is possible for a section of track to have more than one speed limit, each applicable to a different category of vehicle.
811-11-17	speed ratio	The ratio of the maximum service speed to the rated speed at full field with the motors grouped for maximum speed.
811-11-18	tractive effort (at the wheel rim)	The longitudinal force exerted at the wheel rim by the traction motors when motoring.
811-11-19	draw-bar pull	The force measured at the draw-bar of a motor vehicle; unless otherwise indicated the draw-bar pull is referred to level tangent track.
811-11-20	output of a motor vehicle	The total output developed at the traction motor shafts.
811-11-21	output at the wheel rim	The output developed at the driving axles by the traction motors taking into account the overall efficiency of the transmission system. NOTE It is obtained by multiplying the tractive effort by the speed of the vehicle.
811-11-22	output at the draw-bar	The output developed at the draw-bar of the vehicle. NOTE It is obtained by multiplying the draw-bar pull by the speed of the vehicle.
811-11-23	specific output; power-to-mass ratio	The continuous rated traction output of a train unit divided by its gross mass in working order.
811-11-24	specific energy consumption of an electric vehicle	The energy consumption per traffic unit. NOTE The expression of a specific consumption, in order to be complete, has to state the energy and traffic units used and also, owing to the various efficiencies of the parts concerned, indicate where the energy input was measured or calculated.
811-11-25	tare mass (of a vehicle)	The mass of an empty vehicle.
811-11-26	mass in working order	The total of the tare and mass of driving staff and of the various items required in normal service (sand, breakdown equipment, tools, fuel, lubricating oil, etc.).
811-11-27	axle load	Sum of the vertical forces which an axle of a stationary vehicle in working order exerts on the rails on level track.
811-11-28	adhesive weight	The total vertical force exerted on the rails by the driving and coupled axles of a stationary vehicle in working order.
811-11-29	weight per metre run over buffers	The weight of a vehicle in working order divided by its total length over buffers.
811-11-30	weight per metre run between outer axles	The weight of a vehicle in working order divided by the horizontal distance between centres of outer axles.

No.	Term	Definition
811-11-31	maximum concentrated weight per metre	The highest number obtained by dividing each axle load of a vehicle in working order by the horizontal distance between centres of each axle in question and the nearest axle.
811-11-32	peak value (in electric traction)	On motor vehicles where the control includes a definite number of notches or positions for starting and regulation of speed, the term “peak” applies to the value of the quantity concerned immediately after taking a notch. NOTE This term applies especially to current and tractive effort at the wheel rim.
811-11-33	value before notching	On motor vehicles, where the control includes a definite number of notches or positions for starting and regulation of speed, the value of the quantity concerned immediately before taking a notch. NOTE This term applies especially to current and tractive effort at the wheel rim.
811-11-34	selected value; set value	On motor vehicles on which certain quantities are automatically controlled, the value chosen and set by the driver or by a different automatic system.

811-12 Traction motors

811-12-01	traction motor	An electric motor driving one or more axles.
811-12-02	double motor	A traction motor having two armatures mounted on parallel shafts in the same frame.
811-12-03	tandem motor	A traction motor having two armatures mounted on one shaft in a common frame.
811-12-04	double commutator motor	A traction motor having two commutators mounted on the same shaft in the same frame.
811-12-05	totally-enclosed motor	A motor with no deliberate connection between the outside and inside air except for draining and breathing and not fitted with equipment for internal cooling.
811-12-06	ventilated motor	A motor cooled by means of air introduced from outside the motor.
811-12-07	ventilated totally-enclosed motor	A motor so constructed that cooling air which passes through it does not pass over the windings, commutator or slip rings.
811-12-08	self-ventilated motor	A ventilated motor with a fan on its shaft to provide its own cooling.
811-12-09	force-ventilated motor	A ventilated motor for which the cooling air is supplied by a power source independent of its own shaft.
811-12-10	motor with combined ventilation	A motor fitted with both forced and self-ventilation.
811-12-11	axial ventilation	Ventilation in which the cooling air enters the motor at one end and passes longitudinally through the motor before being discharged at the other end.
811-12-12	radial ventilation	Ventilation in which the cooling air inside the motor flows radially.
811-12-13	series motor	A motor with excitation provided by a winding connected in series with the armature winding.