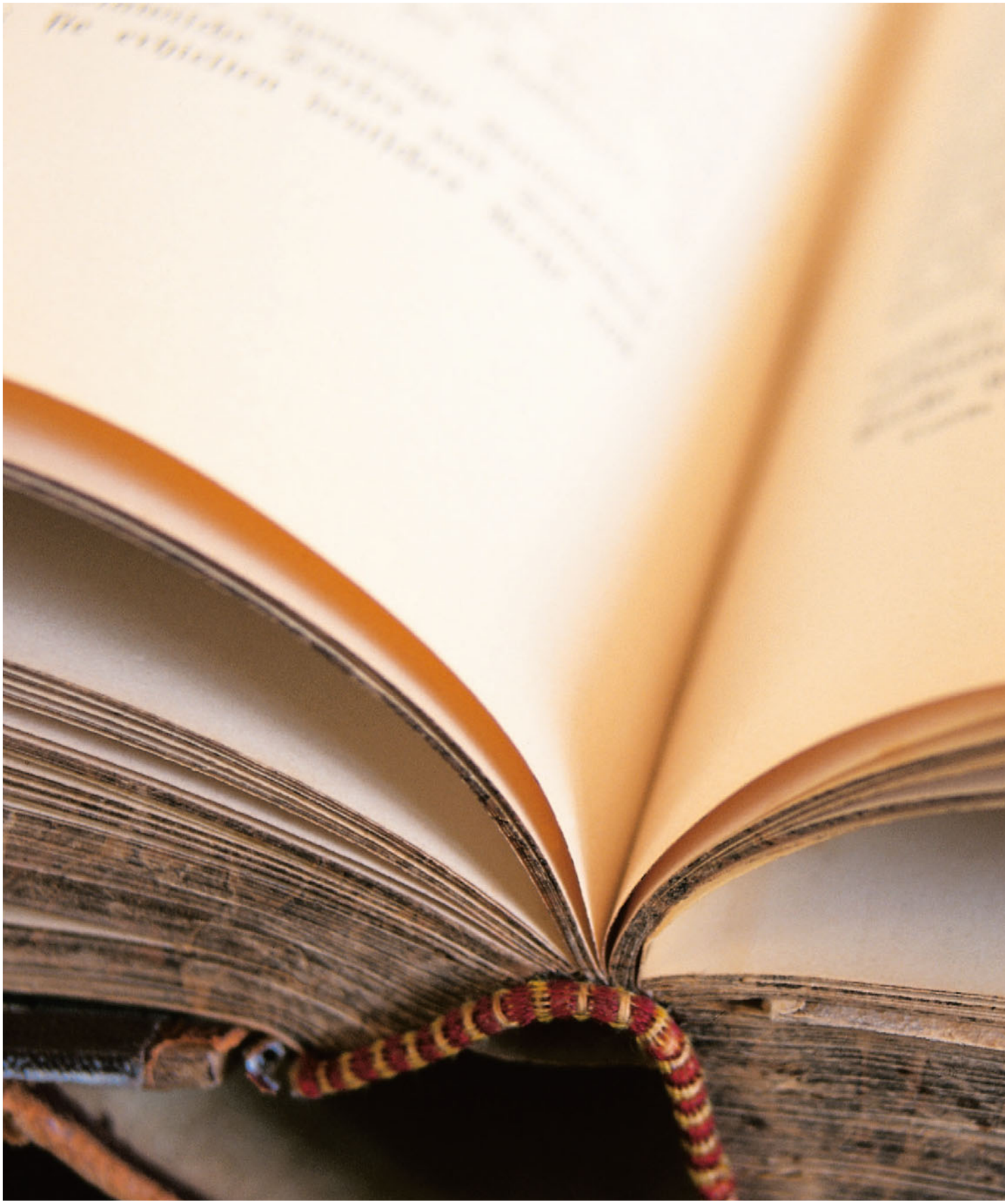

Glossary

A	
Air circuit-breaker	A –> circuit-breaker in which the contacts open and close in air at atmospheric pressure.
Air-insulated outdoor switchyards of open design (AIS)	High voltage substation where all live parts are insulated by air and are not covered. AIS are always set up in a fenced area with access for authorized personal only.
Ambient temperature	Temperature (measured under specific conditions) of the air surrounding an item of electrical equipment. The ambient temperature affects heat dissipation, which can make it necessary to reduce the –> rated current.
Auto-reclosing (of a mechanical switching device)	The operating sequence of a mechanical switching device whereby, following its opening, it closes automatically after a predetermined time.
Automatic multiple shot reclosing	An automatic reclosing repeated two or three times (usually not more) if it is not successful.
B	
Back-up protection	Interaction of two carefully matched overcurrent protective devices connected in series at points where, in the event of a fault, a single device is not capable of switching the prospective short-circuit current. If a correspondingly high short-circuit current occurs, the back-up overcurrent protective device relieves the next downstream overcurrent protective device, thus preventing it from being overloaded.
Blackout	Complete power outage.
Breaking operation	Interruption of an electric circuit as a result of the contact members of a switching device being opened.
Breaking capacity	Highest current a switching device is capable of breaking under specific conditions.
Busbar	A low impedance conductor, to which several electric circuits can be connected separately.
Busbar trunking system	Extended enclosed busbars, equipped with outgoing points for supplying machines and other loads with power via variable tap-off units.
Bushing	Device that enables one or several conductors to pass through a partition such as a wall or a tank and insulate the conductors from it.
C	
Capacitor voltage transformer (CVT)	A –> voltage transformer comprising a capacitor divider unit and an electromagnetic unit designed and interconnected so that the secondary voltage of the electromagnetic unit is substantially proportional to the primary voltage, and differs in phase from it by an angle which is approximately zero for an appropriate direction of the connections.
CAPEX	Capital expenditures of an enterprise for fixed assets, e.g. means of production, buildings etc. –> OPEX.
Continuous improvement process (CIP)	–> Kaizen
Circuit-breaker	A mechanical switching device, capable of making, carrying and breaking currents under normal circuit conditions and also making, carrying for a specified time and breaking currents under specified abnormal circuit conditions such as those of short-circuit.
Common information model (CIM)	The Common Information Model (CIM) is an open standard that defines how managed elements in an IT environment are represented as a common set of objects and relationships between them. This is intended to allow consistent management of these managed elements, independent of their manufacturer or provider.
Contactor	Load breaking device with a limited short-circuit making or breaking capacity, used for high switching rates.
Continuous Function Chart (CFC)	A Siemens engineering tool that offers graphical interconnection and parameterization of off-the-shelf or user-defined function blocks to solve sophisticated continuous control applications –> SFC.
Current limiting	Ability of an overcurrent protective device (fuse or circuit-breaker) to reduce the peak current in a circuit beyond the value of the peak short-circuit current expected on the basis of the circuit constants (R, L), by opening and clearing the fault in a sub-cycle time frame.
Current-limiting circuit-breaker	A circuit-breaker with a break-time short enough to prevent the short-circuit current reaching its otherwise attainable peak value
Current transducer	Transducer used for the measurement of an alternating current.
Current transformer (CT)	Type of instrument transformer designed to provide a current in its secondary winding proportional to the alternating current flowing in its primary. CTs facilitate the safe measurement of large currents, often in the presence of high voltages. The current transformer safely isolates measurement and control circuitry from the high voltages typically present on the circuit being measured.
D	
DCF77	A longwave time signal and standard-frequency radio station. The transmitted data repeats each minute the current date and time, a leap second warning bit, a summer time bit, a primary/backup transmitter identification bit, and several parity bits. The callsign DCF77 stands for D=Deutschland (Germany), C=long wave signal, F=Frankfurt, 77=frequency: 77.5 kHz.
Dead tank circuit-breaker	A –> circuit-breaker with interrupters in an earthed metal tank.
Dielectric strength	Capability of an electrical component to withstand all voltages with a specific time sequence up to the magnitude of the corresponding withstand voltages. These can be operating voltages or higher-frequency voltages caused by switching operations, earth faults (internal overvoltages) or lightning strikes (external overvoltages).

Demilitarized zone (DMZ)	A subnetwork between an organization's LAN and an external network, usually the internet. The hosts in the DMZ contain and provide all external services of an organization such as e-mail or web server, but are not allowed to connect directly to the internal LAN.
Disconnector (isolator)	Mechanical switching device which, in the open position, disconnects all the poles of an electric circuit. Disconnectors are used for no-load closing and opening operations, e. g. to isolate downstream devices so they can be worked on.
Distributed generation units	Generation units, such as PV panels, wind turbines, or cogeneration units, which are connected to the LV or MV distribution network.
E	
Ear and mouth (E&M)	A technology in voice over IP (VoIP) that uses a traditional telephone handset with an earphone (or earpiece) for listening to incoming audio and a microphone (or mouthpiece) for transmitting audio. Calls using an E&M interface can be made from, received from, or disconnected by a private branch exchange (PBX) as well as from a VoIP-capable computer. The term ear and mouth interface is sometimes used as a synonym for a telephone handset itself, or for a headset-and-microphone combination that allows hands-free operation.
Earth fault	Occurrence of an accidental conductive path between a live conductor and the earth.
Earthing switch	Mechanical switching device for earthing parts of an electric circuit, capable of withstanding for a specified duration electric currents under abnormal conditions such as those of short-circuit, but not required to carry electric current under normal conditions of the electric circuit.
ECR	A zero boron glass that is free of added fluorides. It conforms to ASTM D578-1999 specification for E glass. It combines the electrical and mechanical properties of E glass with superior inherent corrosion resistance. ECR glass fiber is an electrical grade corrosion resistant glass fiber.
F	
Feeder	An electric line originating at a main substation and supplying one or more secondary substations.
Flexible AC transmission system (FACTS)	A power electronic based system and other static equipment that provide control of one or more AC transmission system parameters to enhance controllability and increase power transfer capability.
File transfer protocol (FTP)	Transfer protocol for exchanging files over any –> TCP/IP based network.
Fuse	A protective device that by the fusing of one or more of its specially designed and proportioned components, opens the circuit in which it is inserted by breaking the current when this exceeds a given value for a particular period of time. The fuse comprises all the parts that form the complete device.
G	
Gas-insulated switchgear (GIS)	Indoor and outdoor switchgear of compact design and small dimensions for substations up to 550 kV to be installed in urban or industrial loadcenters. All components are housed in earthed metal enclosures filled with sulfur hexafluoride (SF_6) gas for insulation.
Gas-insulated transmission line (GIL)	Transmission lines composed of pipes that house conductors in highly insulative sulfur hexafluoride (SF_6) gas, which have high load-transfer capacity.
Generic Interface Definition	A set of common services used for enterprise integration in the utility industry, defined in IEC standard IEC 61970.
GPRS	A packet oriented mobile data service available to users of –> GSM.
Grid-connected photovoltaic system	A photovoltaic system in which the photovoltaic array acts like a central generating plant, supplying power to the grid.
Grid power flow controller (GPFC)	A concept in system technology within the –> FACTS family of devices that provides an economic solution for the purpose of power transmission between two or more adjacent AC systems. The AC systems can be either synchronous or nonsynchronous. The most proper power rating is between 10 MW and 300 MW, although higher ratings are also achievable.
GSM	A worldwide standard for mobile phones.
H	
Harmonics	The sinusoidal (harmonic) oscillations in the Fourier analysis of non-sinusoidal, periodic oscillations that oscillate at a frequency which is an integer multiple of the fundamental (= system) frequency. The amplitudes of harmonics are considerably smaller than the fundamental frequency.
High voltage	In general a set of voltage levels in excess of –> low voltage (< 1 kV). In a more restrictive sense HV is used for voltage levels typically used for bulk transmission of electricity (> 60 kV).
HTTP/HTTPS	The hypertext transfer protocol/hypertext transfer protocol secure is a communications protocol for the transfer of information on the intranet and the World Wide Web; HTTPS is widely used for security-sensitive communication.
I	
Incoming feeder	In a substation a feeder bay which is normally used to receive power from the system.
Instrument transformer	Transform high currents and voltages into small current or voltage values for measuring or protection purposes.
Inter-Control Center Communication Protocol (ICCP)	The Inter-Control Center Communications Protocol (ICCP or IEC 60870-6/TASE.2) is being specified by utility organizations throughout the world to provide data exchange over wide area networks (WANs) between utility control centers, utilities, power pools, regional control centers, and non-utility generators.

Insulated gate bipolar transistor (IGBT)	A three-terminal power semiconductor device, noted for high efficiency and fast switching.
IRIG timecodes	Family of standardized timecodes used by the U.S. Government and the private industry for the correlation of data and time.
IT system	Power supply system that does not provide a direct connection between live conductors and earthed parts; exposed conductive parts are earthed.
J	
K	
Kaizen	A Japanese philosophy that focuses on continuous improvement throughout all aspects of life, which was first implemented in several Japanese businesses as a management strategy after World War II, adopted to businesses throughout the world also as Continuous Improvement Process (CIP).
Konnex (KNX)	Standardized bus system for home and building applications according to EN 50090 and ISO/IEC 14543, comprising switching, signaling, controlling, monitoring, and indicating functions in the electrical installation.
L	
LCAS	Link Capacity Adjustment Scheme or LCAS is a method to dynamically increase or decrease the bandwidth of virtual concatenated containers to effectively transfer asynchronous data streams over –> SDH.
Live tank circuit-breaker	A –> circuit-breaker with interrupters in a tank insulated from earth.
Low voltage (LV)	Set of voltage levels used for the distribution of energy up to 1,000 V AC, or 1,200 V DC.
L-tripping	Overload protection.
M	
Miniature circuit-breaker (MCB)	Automatically-operated low-voltage switching device designed to protect an electrical circuit from overload or short-circuit. Also used to manually connect or disconnect an electric circuit at will. Rated current not more than 125 A.
Molded-case circuit-breaker (MCCB)	A circuit-breaker having a supporting housing of molded insulating material forming an integral part of the circuit-breaker.
Medium voltage (MV)	Set of voltage levels lying between –> low voltage (LV) and –> high voltage (HV). The boundaries between HV and LV depend on local circumstances and history or common usage. The band 1kV to 52 kV is commonly accepted in Europe. The term medium voltage is nor used in the U.K. nor in Australia.
Metall oxide varistor (MOV)	A discrete electronic component that is commonly used to divert excessive current to the ground and/or neutral lines.
N	
Neutral conductor (N)	A conductor connected to the neutral point of a system, which is suitable for transmitting electrical energy.
N-tripping	Neutral conductor protection.
O	
OASIS	System for reserving transmission capacities in the US power transmission networks.
ODBC	Standard database access method for using database management systems.
OLE	Object Linking and Embedding (OLE) is a technology that allows embedding and linking to documents and other objects developed by Microsoft.
OPC	A set of connectivity standards for industrial automation from the OPC Foundation, which offers interoperability between gauges, databases, programmable logic controllers (PLCs), distributed control systems (DCSs) and remote terminal units (RTUs).
Operating voltage (in a system)	The value of the voltage under normal conditions, at a given instant and a given point of the system.
OPEX	On-going cost for running a product, business, or system.
OSCOP® P	A PC program for retrieving and processing of records made with the SIMEAS R digital fault and power quality recorder, the SIMEAS Q power quality recorder, or with numerical protection relays using the IEC 60870-5-103 protocol.
OSI	A layered, abstract description for communications and computer network protocol design.
Outgoing feeder	A feeder bay in a substation which is normally used to transmit power to the system.
Overcurrent	Any current in an electric circuit that exceeds the –> rated current.
Overload	Operating conditions in an electrically sound, fault-free electric circuit that give rise to an –> overcurrent.
P	
PABX	A telephone exchange that serves a particular business or office, as opposed to one that a common carrier or telephone company operates for many businesses or for the general public.
Pulse-code modulation (PCM)	A digital representation of an analog signal where the magnitude of the signal is sampled regularly at uniform intervals, then quantized to a series of symbols in a numeric (usually binary) code.
PDH	An international multiplexing standard.
PE conductor	Conductor provided for purposes of safety, for example protection against electric shock. In an electrical installation, the conductor identified PE is normally also considered as protective earthing conductor.
Phase-shifting transformer	A device for controlling the power flow through specific lines in a complex power transmission network.
(Photovoltaik) Peak Watt	Maximum "rated" output of a photovoltaic cell, module, or system. Typical rating conditions are 1000 W/m^2 of sunlight, 20 °C ambient air temperature and 1 m/s wind speed.
PEN (conductor)	Combined –> PE and –> N conductor.

Power-line carrier	A device for producing radio-frequency power for transmission on power lines.
Potential transformer (PT)	A device required to provide accurate voltages for meters used for billing industrial customers or utility companies.
Python	A dynamic object-oriented programming language.
Q	
R	
Rated breaking capacity	Value of the short-circuit current a switching device is c apable of breaking at the rated operating voltage, rated frequency and specified power factor (or specified time constant).
Rated breaking current	The load breaking current in normal operation.
Rated current	The current that an electrical device can carry, under specified conditions, without resulting in overheating or mechanical overstress.
Rated insulation level	The –> dielectric strength from phase to earth, between phases and across the open contact gap, or across the isolating distance. The dielectric strength is verified by a lightning impulse withstand voltage test with the standard impulse wave of 1.2 / 50 s and a power-frequency withstand voltage test (50 Hz/1 min).
Rated peak withstand current	The peak value of the major loop of the short-circuit current during a compensation process after the beginning of the current flow, which the device can carry in closed state.
Rated short-circuit breaking current	The root-mean-square value of the breaking current in case of short-circuit at the terminals of the switching device.
Rated short-circuit making current	The peak value of the making current in case of short-circuit at the terminals of the switching device.
Rated voltage	The maximum voltage at which an electric component can operate for extended periods without undue degradation or safety hazard.
Release (of a mechanical switching device)	A device, mechanically connected to a mechanical switching device, which releases the holding means and permits the opening or the closing of the switching device.
Residual current	The sum of the instantaneous values of all currents that flow through all the active conductors of an electrical system at one point.
Residual current device (RCB)	A mechanical switching device designed to make, carry and break currents under normal service conditions and to cause the opening of the contacts when the residual current attains a given value under specified conditions.
Ring main unit (RMU)	Switchgear in distribution systems comprising of switches for switching power cable rings and of switches in series with fuses for the protection of distribution transformers.
Rapid spanning tree protocol (RSTP)	Networking protocol according to IEEE 802.1w to deactivate redundant paths in a local net or to activate them if required (e.g. in case of a failure of a switch, brigde etc.).
Resistance temperatur device/ detector (RTD)	Device for temperature detection based on the resistance change in a metal, with the resistance rising more or less linearly with temperature.
Remote terminal unit (RTU)	An electronic device to transmit data to a distributed control system or a SCADA-system and to alter the state of connected objects based on control messages received from the system.
S	
Switch-disconnector	A switch which, in the open position, satisfies the isolating requirements specified for a disconnector.
Switch-disconnector-fuse (SDF)	A switch-disconnector comprising a –> switch-disconnector and (connected in series zo this) fusebases for insertign fuse-links.
SDH	A multiplexing protocol for transferring multiple bit streams over the same optical fiber.
Selectivity	Combined operation of overcurrent protective devices connnected in series to provide graded disconnection.
Series reactor	A reactor intended for series connection in a network, either for limiting the current under fault conditions or for load-sharing in parallel circuits.
SFC	A graphical programming language used for PLCs. It is one of the five languages defined by IEC 61131-3 standard. The SFC standard is defined in IEC 848, “Preparation of function charts for control systems”.
Short-circuit	Connection of two or more points of an electrical circuit that are meant to be at different voltages across a nebligible small resistance or impedance.
Short-circuit current	Overcurrent which flows through the –> short-circuit which may result in thermal or mechanical overloading of the electrical equipment.
Short-circuit strength	The mechanical resistance of switching devices to short-circuit stress, particularily of busbars in switchgear stations and distrivution boards.
Shunt release	A release energized by a source of voltage.
Shunt reactor	A reactor intended for shunt connection in a network to compensate for capacitive current.
Single-line diagram (SLD)	A simplified notation for representing a three-phase power system in which the polyphase links are represented by their equivalent single line.
Smart grid	Evolving intelligent power distribution network using communication, advanced sensors, and distributed computers to improve the efficiency, reliability and safety of power delivery and use. It includes the possibility for demand side management, facilitating grid connection of distributed generation power (with photovoltaic arrays, small wind turbines, micro hydro, or even combined heat power generators in buildings), grid energy storage for distributed generation load balancing, and improved reliability against many different component failure scenarios.

SNCP	A protection mechanism used in –> SDH
SNMP	SNMP is used in network management systems to monitor network-attached devices for conditions that warrant administrative attention. It consists of a set of standards for network management, including an Application Layer protocol, a database schema, and a set of data objects.
SOAP	A protocol for exchanging –> XML-based messages over computer networks, normally using –> HTTP/HTTPS. Formerly SOAP was a acronym for Simple Object Access Protocol, which was dropped with Version 1.2.
SONET	Multiplexing protocol for transferring multiple bit streams over the same optical fiber.
SQL	Database computer language designed for the retrieval and management of data in relational database management systems.
STM	Synchronous Transport Module (STM), the basic unit of framing in –> SDH
S-tripping	Short-time delay short-circuit protection.
Substation	A part of an electrical system, confined to a given area, mainly including ends of transmission or distribution lines, electrical switchgear and controlgear, buildings and transformers. A substation generally includes safety or control devices (for example protection).
Surge arrester	A device designed to protect the electrical apparatus from high transient overvoltages caused by lightning strikes or switching operations.
Switch/switching device	Device for making or breaking a current in an electric circuit.
Switch-disconnector	A switch which, in the open position, satisfies the isolating requirements specified for a –> disconnector.
T	
Total harmonic distortion (THD)	The THD of a signal is a measurement of the harmonic distortion present and is defined as the ratio of the sum of the powers of all harmonic components to the power of the fundamental frequency.
TN-S, TN-C, TN-C-S	Power supply systems; in the TN-S system the neutral conductor and the protective-earth-conductor-function is separated throughout the system; in the TN-C system neutral-conductor and protective-earth-conductor-function are combined throughout the system; the TN-C-S system is a combination of a TN-C and a TN-S system. In one part of the system neutral-conductor and protective-earth-conductor function are combined, in another part, they are separate.
Total harmonic distortion (THD)	The THD of a signal is a measurement of the harmonic distortion present and is defined as the ratio of the sum of the powers of all harmonic components to the power of the fundamental frequency.
Transformer substation	A substation containing power transformers interconnecting two or more networks of different voltages.
Transient overvoltage	Very short duration increase in voltage, between two or more conductors. Transient overvoltages are mainly caused by the secondary effects of lightning or by electrical switching events and may cause serious damages to components of the electrical supply network.
Tripping current	Current value at which a tripping element trips within a particular time.
TT system	Power supply system; in the TT system one point is directly grounded, all exposed conductive parts are connected to grounding electrodes which are separated from the system grounding.
TTA	Type-tested low voltage switchgear assembly.
Type-tested LV controlgear and switchgear assembly (TTA)	Assembly of low-voltage controlgear and switchgear built and type-tested according to IEC 60439-1/EN 60439-1/DIN VDE 0660-500.
U	
UMTS	Universal Mobile Telecommunications System; third-generation cell phone standard that allows significantly higher data transfer rates than GSM.
USB	Serial bus standard to interface devices.
V	
Virtual power plant (VPP)	A cluster of distributed generation installations which are collectively run by a central control entity. The concerted operational mode shall result in an extra benefit as to deliver peak load electricity or balancing power at short notice.
Visual Basic for Applications (VBA)	An event-driven programming language and associated integrated development environment (IDE) which is built into most Microsoft Office applications.
Voltage divider	Device comprising resistors, inductors, capacitors, transformer(s) or a combination of these components such that, between two points of the device, a desired fraction of the voltage applied to the device as a whole can be obtained.
(Line) voltage drop	The difference at a given instant between the voltages measured at two given points along a line.
Voltage regulator	A tapped step autotransformer used to maintain a desired voltage level all the time.
Voltage surge	A transient voltage wave propagating along a line or a circuit and characterized by a rapid increase followed by a slower decrease of the voltage.
Voltage transducer	Transducer used for the measurement of an alternating voltage.
Voltage transformer	An instrument transformer in which the secondary voltage, in normal conditions of use, is substantially proportional to the primary voltage and differs in phase from it by an angle which is approximately zero for an appropriate direction of the connections.

W	
WDM	Wavelength division multiplex; technology which multiplexes multiple optical carrier signals on a single optical fiber by using different wavelengths (colours) of laser light to carry different signals .
WiBro	South Korean service name for the international standard IEEE 802.16e (mobile WiMAX).
WiMAX	A wireless broadband telecommunications technology based on the IEEE 802.16 standard.
X	
extensible markup language (XML)	Markup language to faciliate the sharing of structured data across different information systems; it is used both to encode documents and to serialize data.
Y	
Z	