



AX1

Terminology

Network Protection & Automation Guide

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Electric

Appendix

AX1

Terminology

The introduction of computer technology means that the Protection Engineer must now be familiar with a range of technical terms in this field, in addition to the terms long associated with Protection and Control. Below is a list of terms and their meanings that are now commonly encountered in the Protection and Control field.

A	531
B	532
C	532
D	534
E	535
F	536
G	536
H	537
I	537
K	539
L	539
M	539

N	540
O	541
P	542
R	543
S	544
T	546
U	546
V	547
W	547
X	547
Y	547
Z	547

AC	Alternating Current.	Anti-pumping device	A feature incorporated in a Circuit Breaker or reclosing scheme to prevent repeated operation where the closing impulse lasts longer than the sum of the relay and CB operating times.
ACB	Air Circuit Breaker.	AO	Analogue Output.
Access point	Represent a network interface of a physical device connected to one Communication Sub Network.	AR	Auto Reclose: A function associated with CB, implemented to carry out reclosure automatically to try to clear a transient fault.
Accuracy	The accuracy of a transducer is defined by the limits of intrinsic error and by the limits of variations.	ARBITER	Proprietary protocol for time synchronisation from ARBITER Systems, Inc. Paso Robles, California USA.
Accuracy class	A number used to indicate the accuracy range of a measurement transducer, according to a defined standard.	Arcing time	The time between instant of separation of the CB contacts and the instant of arc extinction.
ACSI	Abstract Communication Service interface (acc. Communication standards like IEC 61850).	Auto-transformer	A power transformer that does not provide galvanic isolation between primary and secondary windings.
Active power transducer	A transducer used for the measurement of active electrical power.	AUX	Auxiliary.
ADC	Analogue to Digital Converter.	Auxiliary circuit	A circuit which is usually energised by the auxiliary supply but is sometimes energised by the measured quantity.
A/D conversion	The process of converting an analogue signal into an equivalent digital one, involving the use of an analogue to digital converter.	Auxiliary relay	An all-or-nothing relay energised via another relay, for example a measuring relay, for the purpose of providing higher rated contacts, or introducing a time delay, or providing multiple outputs from a single input.
Adjustment	The operation intended to bring a transducer into a state of performance suitable for its use.	Auxiliary supply	An a.c. or d.c. electrical supply other than the measured quantity which is necessary for the correct operation of the transducer.
AGC	Automatic Gain Control.	AVR	Automatic Voltage Regulator.
AGR	Nuclear Advanced Gas Cooled Reactor.		
AI	Analogue Input.		
AIS	Air Insulated Switchgear.		
Alarm	An alarm is any event (see below) tagged as an alarm during the configuration phase.		
All-or-nothing relay	An electrical relay which is intended to be energised by a quantity, whose value is either higher than that at which it picks up or lower than that at which it drops out.		
ANSI	American National Standards Institute (standards).		

Back-up protection	A protection system intended to supplement the main protection in case the latter should be ineffective, or to deal with faults in those parts of the power system that are not readily included in the operating zones of the main protection.	Broadcast communication	Communication message from one source to all connected partners in a communication network.
Bay	Set of LV, MV, or HV plant and devices, usually controlled by a bay computer.	Booster transformer	A current transformer whose primary winding is in series with the catenary and secondary winding in the return conductor of a classically-fed a.c. overhead electrified railway. Used at intervals to ensure that stray traction return currents, with their potential to cause interference in nearby communication circuits, are minimised.
BC	Bay Computer: Computer dedicated to the control of one or several bays within a substation.	BT	Booster Transformer.
BCD	Binary Coded Decimal.	Burden	The loading imposed by the circuits of the relay on the energising power source or sources, expressed as the product of voltage and current (volt-amperes, or watts if d.c.) for a given condition, which may be either at 'setting' or at rated current or voltage. The rated output of measuring transformers, expressed in VA, is always at rated current or voltage and it is important, in assessing the burden imposed by a relay, to ensure that the value of burden at rated current is used.
BCP	Bay Control Point: A local keypad at bay level to control the elements of a single bay.		
Biased relay	A relay in which the characteristics are modified by the introduction of some quantity other than the actuating quantity, and which is usually in opposition to the actuating quantity.		
Bias current	The current used as a bias quantity in a biased relay.		
BIOS	Basic Input/Output System (of a computer or microprocessor).		

C	Capacitance.	CB	Circuit Breaker.
CAD	Computer Aided Design.	CBC	Compact Bay Controller: Small capacity bay computer for Medium Voltage applications.
Calibration	The set of operations which establish, under specified conditions, the relationship between values indicated by a transducer and the corresponding values of a quantity realised by a reference standard. (This should not be confused with 'adjustment', q.v.).	CBCT	Core Balance Current Transformer.
		CCR	Central Control Room.
		CDC	Common Data Class (data model element in IEC 61850).

CDM	Conceptual Data Modelling is an activity whose aims are: <ul style="list-style-type: none"> • to define objects and links and naming conventions for their identifications • to guarantee interoperability between subsystems • to define standard exchange formats between system configurator and subsystem configurator. 	Client	Entity that requests a service from a server in a communication network.
CET	Central European Time.	Closing impulse time	The time during which a closing impulse is given to the CB.
Characteristic angle	The angle between the vectors representing two of the energising quantities applied to a relay and used for the declaration of the performance of the relay.	Closing time	The time for a CB to close, from the time of energisation of the closing circuit to making of the CB contacts.
Characteristic curve	The curve showing the operating value of the characteristic quantity corresponding to various values or combinations of the energising quantities.	Communication service	Service to exchange information between two communication partners with well-defined procedures and data models.
Characteristic impedance ratio (C.I.R.)	The maximum value of the System Impedance Ratio up to which the relay performance remains within the prescribed limits of accuracy.	Compliance voltage (accuracy limiting output voltage)	For current output signals only, the output voltage up to which the transducer meets its accuracy specification.
Characteristic quantity	A quantity, the value of which characterises the operation of the relay, for example, current for an overcurrent relay, voltage for a voltage relay, phase angle for a directional relay, time for an independent time delay relay, impedance for an impedance relay.	Conjunctive test	A test of a protection system including all relevant components and ancillary equipment appropriately interconnected. The test may be parametric or specific.
Check protection system	An auxiliary protection system intended to prevent tripping due to inadvertent operation of the main protection system.	Control services	A set of communication services used by a client to act on the process or on a IED.
CHP	Combined Heat and Power.	Conversion coefficient	The relationship of the value of the measurand to the corresponding value of the output.
CID	Configured IED Description (IEC 61850 engineering file format based on XML/SCL).	Core balance current transformer	A ring-type Current Transformer in which all primary conductors are passed through the aperture of the CBCT. Hence the secondary current is proportional only to any imbalance in current. Used for sensitive earth-fault protection.
Circuit insulation voltage	The highest circuit voltage to earth on which a circuit of a transducer may be used and which determines its voltage test.	Counting relay	A relay that counts the number of times it is energised and actuates an output after a desired count has been reached.
Class index	The number which designates the accuracy class.	CSV	Character (or Comma) Separated Values format: A widely used format for the exchange of data between different software, in which the individual data items are separated by a known character – usually a comma.
		CT	Current Transformer.
		Current transducer	A transducer used for the measurement of a.c. current.

CVT	Capacitor Voltage Transformer: A voltage transformer that uses capacitors to obtain a voltage divider effect. Used at EHV voltages instead of an electromagnetic VT for size/cost reasons.
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DA	Data Attribute (data model element in IEC 61850).	Dependent time measuring relay	A measuring relay for which times depend, in a specified manner, on the value of the characteristic quantity.
DAC	Digital to Analogue Converter.	DER	Distributed Energy Resource.
DAR	Delayed Auto-Reclose.	DFT	Discrete Fourier Transformation.
DAT	Digital Audio Tape.	DG	Distributed Generation.
Data model	Data structure of an IED used to communicate with other communication partners.	Digital signal processor	A microprocessor optimised in both hardware architecture and software instruction set for the processing of analogue signals digitally, through use of the DFT and similar techniques.
Data set	Ordered group of DO (Data Object) and DA (Data Attribute) references.	Digital signal processing	A technique for the processing of digital signals by various filter algorithms to obtain some desired characteristics in the output. The input signal to the processing algorithm is usually the digital representation of an analogue signal, obtained by A/D conversion.
DBMS	Data Base Management System.	Directional relay	A protection relay in which the tripping decision is dependent in part upon the direction in which the measured quantity is flowing.
DCF 77	LF transmitter located at Mainflingen, Germany, broadcasting a time signal on a 77.5 kHz frequency.	Discrimination	The ability of a protection system to distinguish between power system conditions for which it is intended to operate and those for which it is not intended to operate.
DCP	Device Control Point: Local keypad on device level to control the switchgear, often combined with local/remote switch.	Distortion factor	The ratio of the r.m.s. value of the harmonic content to the r.m.s. value of the non- sinusoidal quantity.
DCS	Distributed Control System.		
Dead time (auto- reclose)	The time between the fault arc being extinguished and the CB contacts re- making.		
De-ionisation time (auto-reclose)	The time required for dispersion of ionised air after a fault is cleared so that the arc will not re-strike on re-energisation.		
Delayed auto-reclose	An auto-reclosing scheme which has a time delay in excess of the minimum required for successful operation.		

D

DNP, DNP3	Distributed Network Protocol: A proprietary communication protocol used on secondary networks between HMI, substation computers or bay computers and protective devices.	Drop-out (or drop-off)	A relay drops out when it moves from the energised position to the un-energised position.
DO	Data Object (data model element in IEC 61850).	Drop-out /pick-up ratio	The ratio of the limiting values of the characteristic quantity at which the relay resets and operates. This value is sometimes called the differential of the relay.
DOL	Direct-on-Line.	DSP	Digital Signal Processor, Digital Signal Processing.
Direct-on-line	A method of motor starting, in which full line voltage is applied to a stationary motor.	DT	Definite Time.

E

Earth fault protection system	A protection system which is designed to respond only to faults to earth.	Electromechanical relay	An electrical relay in which the designed response is developed by the relative movement of mechanical elements under the action of a current in the input circuit.
Earthing transformer	A three-phase transformer intended essentially to provide a neutral point to a power system for the purpose of earthing.	EMC	Electro-Magnetic Compatibility: Immunity against electromagnetic interferences.
Effective range	The range of values of the characteristic quantity or quantities, or of the energising quantities to which the relay will respond and satisfy the requirements concerning it, in particular those concerning precision.	Embedded generation	Generation that is connected to a distribution system (possibly at LV instead of HV) and hence poses particular problems in respect of electrical protection.
Effective setting	The 'setting' of a protection system including the effects of current transformers. The effective setting can be expressed in terms of primary current or secondary current from the current transformers and is so designated as appropriate.	E.m.f.	Electro-Motive Force (or voltage).
Electrical relay	A device designed to produce sudden predetermined changes in one or more electrical circuits after the appearance of certain conditions in the electrical circuit or circuits controlling it. NOTE: The term 'relay' includes all the ancillary equipment calibrated with the device.	Energising quantity	The electrical quantity, either current or voltage, which along or in combination with other energising quantities, must be applied to the relay to cause it to function.
		EPROM	Electrically Programmable Read Only Memory.
		Error (of a transducer)	The actual value of the output minus the intended value of the output, expressed algebraically.
		Ethernet	Most used networking technology for LAN.
		Event	An event is any information acquired or produced by the digital control system.

FACTS	Flexible Alternative Current Transmission System.		statements of accuracy for frequency transducers to refer to 'percent of centre-scale frequency' and, for phase angle transducers, to an error in electrical degrees).
FAT	Factory Acceptance Test: Validation procedures witnessed by the customer at the factory.		
Fault passage indicator	A sensor that detects the passage of current in excess of a set value (i.e. current due to a fault) at the location of the sensor. Hence, it indicates that the fault lies downstream of the sensor.	FLS	Fast Load Shedding.
		FN	Functional Naming is the reflection of the functional application view (like in a substation) in the naming of the structural elements of an IED data model in IEC 61850.
FBD	Functional Block Diagram: One of the IEC 61131-3 programming languages.	FPI	Fault Passage Indicator.
		fPN	Flexible Product Naming in IEC 61850 to describe the capability of an IED to allow restructuring of the device data model.
FC	Functional constraint (data model element in IEC 61850).		
Fiducial value	A clearly specified value to which reference is made in order to specify the accuracy of a transducer. (For transducers, the fiducial value is the span, except for transducers having a reversible and symmetrical output, when the fiducial value may be either the span or half the span as specified by the manufacturer. It is still common practice, however, for	Frequency transducer	A transducer used for the measurement of the frequency of an a.c. electrical quantity.
		Full duplex communication	A communications system in which data can travel simultaneously in both directions.

Gateway	The Gateway is a computer which provides interfaces between the local computer system and one or several SCADA (or RCC) systems.	Global positioning system	A system used for locating objects on Earth precisely, using a system of satellites in geostationary orbit in space. Used by some numerical relays to obtain accurate time information.
GBit	Giga-Bit (transfer rate for data communication).		
GCB	GOOSE Control Block (GOOSE = Generic Object Oriented Substation Event) used to configure the subscription of a GOOSE in the IEC61850 communication network.	GMT	Greenwich Mean Time.
		GOOSE	Generic Object Oriented Substation Event (used for fast data transfer on low communication layer acc. IEC 61850).
GIS	Gas Insulated Switchgear (usually SF6).	GPS	Global Positioning System.
		GTO	Gate Turn-off Thyristor.

H

Half-duplex communication	A communications system in which data can travel in both directions, but only in one direction at a time.	HRC	High Rupturing Capacity (applicable to fuses).
High-speed reclosing	A reclosing scheme where re-closure is carried out without any time delay other than that required for de-ionisation, etc.	HSR	a) High Speed Reclosing b) High availability Seamless Redundancy protocol (see IEC 62439-3).
HMI	Human Machine Interface: The means by which a human inputs data to and receives data from a computer-based system. Usually takes the form of a Personal Computer (PC) (desktop or portable) with keyboard, screen and pointing device.	HV	High Voltage.
		HVDC	High Voltage Direct Current.

I

I	Current.	IED	Intelligent Electronic Device: Equipment containing a microprocessor and software used to implement one or more functions in relation to an item of electrical equipment (e.g. a bay controller, remote SCADA interface/protocol converter). A microprocessor-based numerical relay is also an IED. IED is a generic term used to describe any microprocessor-based equipment, apart from a computer.
ICCP	Term used for IEC 60870-6-603 protocol.	IEEE	Institute of Electrical and Electronics Engineers.
ICD	IED Capability Description (IEC 61850 engineering file format based on XML/SCL).	IEEE 1588	Also named PTP for Precision Time Protocol.
ICT	Interposing Current Transformer (software implemented).	IEEE 1815	IEEE name for DNP3.
I.D.M.T.	Inverse Definite Minimum Time.	IET	IED Configuration Tool (acc. IEC 61850).
IEC	International Electro Technical Commission (standards).	IID	Instantiated IED Description (IEC 61850 engineering file format based on XML/SCL).
IEC 60870-5-101/103/104	Set of conventional communication protocols used for automation systems named as "Telecontrol equipment and systems: Transmission protocols for the informative interface of protection equipment" (T101 for network control level, T103 for substation control level, T104 for mapping of T101 over Ethernet).	IGBT	Insulated Gate Bipolar Transistor.
IEC 61850	International standard for the communication networks and systems for power utility automation.		

Independent time measuring relay	A measuring relay, the specified time for which can be considered as being independent, within specified limits, of the value of the characteristic quantity.	Interoperability	Ability of two or more intelligent electronic devices from the same vendor, or different vendors, to exchange information and to use that information for correct co-operation.
Influence quantity	A quantity which is not the subject of the measurement but which influences the value of the output signal for a constant value of the measurand.	Intrinsic error	An error determined when the transducer is under reference conditions.
Input quantity	The quantity, or one of the quantities, which constitute the signals received by the transducer from the measured system.	Inverse time delay relay	A dependent time delay relay having an operating time which is an inverse function of the electrical characteristic quantity.
Instantaneous relay	A relay that operates and resets with no intentional time delay. NOTE: All relays require some time to operate; it is possible, within the above definition, to discuss the operating time characteristics of an instantaneous relay.	Inverse time relay with definite minimum time (I.D.M.T.)	An inverse time relay having an operating time that tends towards a minimum value with increasing values of the electrical characteristic quantity.
Insulated gate bipolar transistor	A special design of transistor that is suitable for handling high voltages and currents (relative to an ordinary transistor). Frequently used in static power control equipment (inverters, controlled rectifiers, etc) due to the flexibility of control of the output.	IRIG-B	An international standard for time synchronisation.
Interchangeability	Possibility to replace one intelligent electronic device by another one, without additional modifications of the equipment around it. This possibility is normally only given when the same type of IED or system component from the same vendor on the same product platform is used as a replacement.	ISO	International Standards Organisation.
		IP	Internet Protocol.
		I/O	Input/Output.

K

K-bus (K-bus courier)	Term used for the Courier protocol on K-Bus interface.	Knee-point e.m.f.	That sinusoidal e.m.f. applied to the secondary terminals of a current transformer, which, when increased by 10%, causes the exciting current to increase by 50%.
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L

L	Inductance.	LN	Logical Node (data model element in IEC 61850).
LAN	Local Area Network.	Local control mode	When set for a given control point it means that the commands can be issued from this point.
LCD	Liquid Crystal Display.	Lock-out (auto-reclose)	Prevention of a CB reclosing after tripping.
LD	a) Ladder Diagram. One of the IEC 61131-3 programming languages b) Logical Device (data model element in IEC 61850).	Long-term stability	The stability over a period of one year.
LDC	Line Drop Compensator.	Low-speed auto-reclose	See Delayed Auto-Reclose.
LED	Light Emitting Diode.	LV	Low Voltage.
Limiting value of the output current	The upper limit of output current which cannot, by design, be exceeded under any conditions.		

M

Main protection	The protection system which is normally expected to operate in response to a fault in the protected zone.	Measurand	A quantity subjected to measurement.
Maximum permissible values of the input current and voltage	Values of current and voltage assigned by the manufacturer which the transducer will withstand indefinitely without damage.	Measuring element	A unit or module of a transducer which converts the measurand, or part of the measurand, into a corresponding signal.
MCB	Miniature Circuit Breaker.	Measuring range	That part of the span where the performance complies with the accuracy requirements.
MCCB	Moulded Case Circuit Breaker.	Measuring relay	An electrical relay intended to switch when its characteristic quantity, under specified conditions and with a specified accuracy, attains its operating value.
Mean-sensing transducer	A transducer which actually measures the mean (average) value of the input waveform but which is adjusted to give an output corresponding to the r.m.s. value of the input when that input is sinusoidal.		

Metering (non-tariff)	Values computed depending on the values of digital or analogue inputs during variable periods.	MPSS	Mid Point Sectioning Substation (for electrified railways).
Metering (tariff)	Energy values computed from digital and/ or analogue inputs during variable periods and dedicated to energy measurement for billing (tariff) purposes.	MTA	Maximum Torque Angle.
		Multicast communication	Communication message from one source to a group of selected partners in a communication network.
MICS	Model Implementation Conformance Statement (IEC 61850 engineering file).	Multi-element transducer	A transducer having two or more measuring elements. The signals from the individual elements are combined to produce an output signal corresponding to the measurand.
Mid point sectioning substation (MPSS)	A substation located at the electrical interface of two sections of electrified railway. It contains provision for the coupling of the sections electrically in the event of loss of supply to one section.	Multi-section transducer	A transducer having two or more independent measuring circuits for one or more functions.
MMS	Manufacturing Messaging Specification (used acc. IEC 61850 as interface between TCP/IP and the application layer).	Multi-shot reclosing	A reclosing scheme that permits more than one reclosing operation of a CB after a fault occurs before lock-out occurs.
ModBus	Proprietary communication protocol used on secondary networks between HMI, substation computers or bay computers and protective devices.	MV	Medium Voltage.

N/C	Normally Closed.	NPS	Negative Phase Sequence.
N/O	Normally Open.	NS	Neutral Section (electrified railways).
Nominal range of use	A specified range of values which it is intended that an influence quantity can assume without the output signal of the transducer changing by amounts in excess of those specified.	Numerical relay	A protection relay which utilises a Digital Signal Processor to execute the protection algorithms in software.
Notching relay	A relay which switches in response to a specific number of applied impulses.	NVD	Neutral Voltage Displacement (protection).

OCB	Oil Circuit Breaker.	Output common mode interference voltage	An unwanted alternating voltage which exists between each of the output terminals and a reference point.
Off-load tap changer	A tap changer that is not designed for operation while the transformer is supplying load.	Output current (of a transducer)	The current produced by the transducer which is an analogue function of the measurand.
OHL	Overhead Line	Output load	The total effective resistance of the circuits and apparatus connected externally across the output terminals.
OLTC	On Load Tap Changer.	Output power (of a transducer)	The power available at the transducer output terminals.
On load tap changer	A tap changer that can be operated while the transformer is supplying load.	Output series mode interference voltage	An unwanted alternating voltage appearing in series between the output terminals and the load.
Opening time	The time between energisation of a CB trip coil and the instant of contact parting.	Output signal	An analogue or digital representation of the measurand.
Operating current (relay)	The current at which a relay will pick up.	Output span (span)	The algebraic difference between the lower and upper nominal values of the output signal.
Operating time (CB)	The time between energisation of a CB trip coil and arc extinction.	Overcurrent relay	A protection relay whose tripping decision is related to the degree by which the measured current exceeds a set value.
Operating time (relay)	With a relay de-energised and in its initial condition, the time which elapses between the application of a characteristic quantity and the instant when the relay operates.	Overshoot time	The overshoot time is the difference between the operating time of the relay at a specified value of the input energising quantity and the maximum duration of the value of input energising quantity which, when suddenly reduced to a specific value below the operating level, is insufficient to cause operation.
Operating time characteristic	The curve depicting the relationship between different values of the characteristic quantity applied to a relay and the corresponding values of operating time.		
Operating value	The limiting value of the characteristic quantity at which the relay actually operates.		
OPGW	Optical Ground Wire: A ground wire that includes optical fibres to provide a communications link.		
OSI 7-layer model	The Open Systems Interconnection 7-layer model is a model developed by ISO for modelling of a communications network.		

Parametric conjunctive test	A conjunctive test that ascertains the range of values of each parameter for which the test meets specific performance requirements.	Power electronic device	An electronic device (e.g. thyristor or IGBT) or assembly of such devices (e.g. inverter). Typically used in a power transmission system to provide smooth control of output of an item of plant.
PCB	Printed Circuit Board.	Power factor	The factor by which it is necessary to multiply the product of the voltage and current to obtain the active power.
PCC	Point of Common Coupling.	Power line carrier communication	A means of transmitting information over a power transmission line by using a carrier frequency superimposed on the normal power frequency.
PD	Physical Device (data model element in IEC 61850).	PPS	Positive Phase Sequence.
PED	Power Electronic Device.	Protected zone	The portion of a power system protected by a given protection system or a part of that protection system.
Phase angle transducer	A transducer used for the measurement of the phase angle between two a.c. electrical quantities having the same frequency.	Protection equipment	The apparatus, including protection relays, transformers and ancillary equipment, for use in a protection system.
Pick-up	A relay is said to 'pick-up' when it changes from the de-energised position to the energised position.	Protection relay	A relay designed to initiate disconnection of a part of an electrical installation or to operate a warning signal, in the case of a fault or other abnormal condition in the installation. A protection relay may include more than one electrical element and accessories.
PICS	Protocol Implementation Conformance Statement (IEC 61850 engineering file).	Protection scheme	The co-ordinated arrangements for the protection of one or more elements of a power system. A protection scheme may comprise several protection systems.
Pilot channel	A means of interconnection between relaying points for the purpose of protection.	Protection system	A combination of protection equipment designed to secure, under predetermined conditions, usually abnormal, the disconnection of an element of a power system, or to give an alarm signal, or both.
PIXIT	Protocol Implementation eXtra Information for Testing (IEC 61850 engineering file).	Protocol	A set of rules that define the method in which a function is carried out – commonly used in respect of communications links, where it defines the hardware and software features necessary for successful communication between devices.
PLC	Programmable Logic Controller: A specialised computer for implementing control sequences using software.		
PLCC	Power Line Carrier Communication.		
PN	Product Naming is the fixed or default data model of the IED reflecting the complete hierarchy/structure of the functions inside an IED in IEC 61850.		
Point of common coupling	The interface between an in-plant network containing embedded generation and the utility distribution network to which the in-plant network is connected.		
POW	Point-on-Wave: Point-on-Wave switching is the process to control the moment of switching to minimise the effects (inrush currents, overvoltages).		

P

PRP	Parallel Redundancy Protocol (see IEC 62439-3).	PSTN	Public Switched Telephone Network.
PSM	Plug Setting Multiple: A term used in conjunction with electromechanical relays, denoting the ratio of the fault current to the current setting of the relay.	PT100	Platinum resistance temperature probe.

R

R	Resistance.	Reclaim time (auto-reclose)	The time between a successful closing operation, measured from the time the auto-reclose relay closing contact makes until a further reclosing sequence is permitted in the event of a further fault occurring.
R.m.s. sensing transducer	A transducer specifically designed to respond to the true r.m.s. value of the input and which is characterised by the manufacturer for use on a specified range of waveforms.	REF	Restricted Earth Fault.
Ratio correction	A feature of digital/numerical relays that enables compensation to be carried out for a CT or VT ratio that is not ideal.	Reference conditions	Conditions of use for a transducer prescribed for performance testing, or to ensure valid comparison of results of measurement.
Rating	The nominal value of an energising quantity that appears in the designation of a relay. The nominal value usually corresponds to the CT and VT secondary ratings.	Reference range	A specified range of values of an influence quantity within which the transducer complies with the requirements concerning intrinsic errors.
RCA	Relay Characteristic Angle.	Reference value	A specified single value of an influence quantity at which the transducer complies with the requirements concerning intrinsic errors.
RCB	Report Control Block used to configure the publishing of a report by the related communication server.	Relay	See Protection Relay.
RCD	Residual Current Device. A protection device which is actuated by the residual current.	Report	Set of data sent from a server to a client in a communication network.
RCP	Remote Control Point: The Remote Control Point is a SCADA interface. Several RCP's may be managed with different communication protocols. Physical connections are done at a Gateway or at substation computers or at a substation HMI.	Resetting value	The limiting value of the characteristic quantity at which the relay returns to its initial position.
Reactive power (Var) transducer	A transducer used for the measurement of reactive electrical power.	Residual current	The algebraic sum, in a multi-phase system, of all the line currents.
		Residual voltage	The algebraic sum, in a multi-phase system, of all the line-to-earth voltages.

Response time	The time from the instant of application of a specified change of the measurand until the output signal reaches and remains at its final steady value or within a specified band centred on this value.	ROCOF (protection relay)	Rate Of Change Of Frequency.
Reversible output current	An output current which reverses polarity in response to a change of sign or direction of the measurand.	ROCOV (protection relay)	Rate Of Change Of Voltage.
Ripple content of the output	With steady-state input conditions, the peak-to-peak value of the fluctuating component of the output.	RSVC	Relocatable Static Var Compensator.
R.m.s.	Root Mean Square.	RTD	Resistance Temperature Detector.
RMU	Ring Main Unit.	RTOS	Real Time Operating System.
		RTU	Remote Terminal Unit: An IED used specifically for interfacing between a computer and other devices. Sometimes may include control/monitoring/storage functions.

SAT	Site Acceptance Test: Validation procedures for equipment executed with the customer on site.		based on XML/SCL).
SCADA	Supervisory Control and Data Acquisition.	Server	Entity that manages data and responds to requests from clients in a communication network.
SCD	Substation Configuration Description (IEC 61850 engineering file format based on XML/SCL).	Setting	The limiting value of a 'characteristic' or 'energising' quantity at which the relay is designed to operate under specified conditions. Such values are usually marked on the relay and may be expressed as direct values, percentages of rated values, or multiples.
SCL	Substation Configuration Language: Normalised configuration language for substation modelling (as expected by IEC 61850-6).	SFC	Sequential Function Chart: One of the IEC 61131-3 programming languages.
SCP	Substation Control Point: HMI computers at substation level allowing the operators to control the substation.	Short-term stability	The stability over a period of 24 hours.
SCS	Substation Control System.	Simplex communications system	A communications system in which data can only travel in one direction.
SCT	System Configuration Tool (acc. IEC 61850).	Single-shot reclosing	An auto-reclose sequence that provides only one reclosing operation, lock-out of the CB occurring if it subsequently trips.
SDA	Sub Data Attribute (data model element in IEC 61850).	S.I.R.	System Impedance Ratio.
SDO	Sub Data Object (data model element in IEC 61850).		
SED	System Exchange Description (IEC 61850 engineering file format		

Single element transducer	A transducer having one measuring element.	Starting relay	A unit relay which responds to abnormal conditions and initiates the operation of other elements of the protection system.
SLD	Single Line Diagram.		
SNTP	Simple Network Time Protocol: Used acc. IEC 61850 for time synchronisation.	STATCOM	A particular type of Static Var Compensator, in which Power Electronic Devices such as GTO's are used to generate the reactive power required, rather than capacitors and inductors.
SOE	Sequence Of Events.		
SOTF	Switch On To Fault (protection).		
Specific conjunctive test	A conjunctive test using specific values of each of the parameters.	Static relay	An electrical relay in which the designed response is developed by electronic, magnetic, optical or other components without mechanical motion. Excludes relays using digital/numeric technology.
Spring winding time	For spring-closed CB's, the time for the spring to be fully charged after a closing operation.		
SSD	System Specification Description (IEC 61850 engineering file format based on XML/SCL).	Static var compensator	A device that supplies or consumes reactive power, comprised solely of static equipment. It is shunt-connected on transmission lines to provide reactive power compensation.
SST	System Specification Tool (acc. IEC 61850).		
ST	Structured Text: One of the IEC 61131-3 programming languages.	STC	Short Time Current (rating of a CT).
Stability (of a transducer)	The ability of a transducer to keep its performance characteristics unchanged during a specified time, all conditions remaining constant.	Storage conditions	The conditions, defined by means of ranges of the influence quantities, such as temperature, or any special conditions, within which the transducer may be stored (non-operating) without damage.
Stability (of a protection system)	The quantity whereby a protection system remains inoperative under all conditions other than those for which it is specifically designed to operate.	SVC	Static Var Compensator.
Stability limits (of a protection system)	The r.m.s. value of the symmetrical component of the through fault current up to which the protection system remains stable.	System disturbance time (auto-reclose)	The time between fault inception and CB contacts making on successful re-closure.
		System impedance ratio	The ratio of the power system source impedance to the impedance of the protected zone.

T101, T103	Term used for IEC 60870-5-101 and -103 protocol.	Time delay	A delay intentionally introduced into the operation of a relay system.
Tap changer	A mechanism, usually fitted to the primary winding of a transformer, to alter the turns ratio of the transformer by small discrete amounts over a defined range.	Time delay relay	A relay having an intentional delaying device.
TCP/IP	Transmission Control Protocol/Internet Protocol: A common protocol for the transmission of messages over the Internet.	Tissue	Technical issues on a standard raised after its publication.
TCS	Trip Circuit Supervision.	TPI	Tap Position Indicator (for transformers).
TC57	Technical Committee 57 working for the IEC and responsible for producing standards in the field of Protection (e.g. IEC 61850)	TR	Technical Report (of a standard)
TF	a) Transfer Function of a device (usually an element of a control system) b) Transient Factor (of a CT).	Transducer (electrical measuring transducer)	A device that provides a d.c. output quantity having a definite relationship to the a.c. measurand.
Through fault current	The current flowing through a protected zone to a fault beyond that zone.	Transducer with zero (live zero)	A transducer which gives an offset predetermined output other than zero when the measurand is zero.
TICS	Technical Issue Conformance Statement (IEC 61850 engineering file).	Transducer with suppressed zero	A transducer whose output is zero when the measurand is less than a certain value.
		TS	Technical Specification (of a standard).

Unicast communication	Message from one source to one selected partner in a communication network.	Unrestricted protection	A protection system which has no clearly defined zone of operation and which achieves selective operation only by time grading.
Unit electrical relay	A single relay that can be used alone or in combination with others.	UCA	Utility Communications Architecture.
Unit protection	A protection system that is designed to operate only for abnormal conditions within a clearly defined zone of the power system.	UFLS	Underfrequency Load Shedding.
		UPS	Uninterruptible Power Supply.
		UTC	Universal Time Coordinates.

V

V	Voltage.	VLAN	Virtual Local Area Network.
VCB	Vacuum Circuit Breaker.	Voltage transducer	A transducer used for the measurement of a.c. voltage.
VDEW	Term used for IEC 60870-5-103 protocol. The VDEW protocol is a subset of the IEC 60870-5-103 protocol (VDEW: German association of the electro-technical and water industry).	VT	Voltage Transformer.
Vector group compensation	A feature of digital and numerical relays that compensates for the phase angle shift that occurs in transformers (including VT's) due to use of dissimilar winding connections – e.g. transformers connected delta/star.		

W, X, Y, Z

WAN	Wide Area Network.	X/R	Ratio of system reactance to resistance.
Web service	Standardised method of communication between two devices on a communication network.	Y	Admittance (reciprocal of impedance).
X	Reactance.	Z	Impedance.
XML	Extensible Markup Language: Used to structure ASCII characters to define specific data file formats.		

