



Appendix 1
Terminology

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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.

AC

Alternating Current

ACB

Air Circuit Breaker

Accuracy

The accuracy of a transducer is defined by the limits of intrinsic error and by the limits of variations.

Accuracy class

A number used to indicate the accuracy range of a measurement transducer, according to a defined standard.

Active power (watt) transducer

A transducer used for the measurement of active electrical power

ADC

Analogue to Digital Converter

A/D Conversion

The process of converting an analogue signal into an equivalent digital one, involving the use of an analogue to digital converter

Adjustment

The operation intended to bring a transducer into a state of performance suitable for its use

AGC

Automatic Gain Control

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

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

AO

Analogue Output

AR

Auto Reclose: A function associated with CB, implemented to carry out reclosure automatically to try to clear a transient fault

ARBITER

Proprietary protocol for time synchronisation from ARBITER Systems, Inc. Paso Robles, California USA

Arcing time

The time between instant of separation of the CB contacts and the instant of arc extinction

Auto-transformer

A power transformer that does not provide galvanic isolation between primary and secondary windings

AUX

Auxiliary

Auxiliary circuit

A circuit which is usually energised by the auxiliary supply but is sometimes energised by the measured quantity

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.

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

AVR

Automatic Voltage Regulator

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

Bay

Set of LV, MV, or HV plant and devices, usually controlled by a bay computer

BC

Bay Computer. Computer dedicated to the control of one or several bays within a substation

BCD

Binary Coded Decimal

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)

BT

Booster Transformer

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

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

C

Capacitance

CAD

Computer Aided Design

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 realized by a reference standard. (This should not be confused with 'adjustment', q.v.)

CB

Circuit Breaker

CBC

Compact Bay Controller. Small capacity bay computer for Medium Voltage applications

CBCT

Core Balance Current Transformer

CCR

Central Control Room

CDM

Conceptual Data Modelling is an activity whose aims are:

- 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 configurators

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

Characteristic curve

The curve showing the operating value of the characteristic quantity corresponding to various values or combinations of the energising quantities

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

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

Check protection system

An auxiliary protection system intended to prevent tripping due to inadvertent operation of the main protection system

CHP

Combined Heat and Power

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

Class index

The number which designates the accuracy class

Closing Impulse time

The time during which a closing impulse is given to the CB

Closing Time

The time for a CB to close, from the time of energisation of the closing circuit to making of the CB contacts

Compliance voltage (accuracy limiting output voltage)

For current output signals only, the output voltage up to which the transducer meets its accuracy specification

Conjunctive test

A test of a protection system including all relevant components and ancillary equipment appropriately interconnected. The test may be parametric or specific

Conversion coefficient

The relationship of the value of the measurand to the corresponding value of the output

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

Counting Relay

A relay that counts the number of times it is energised and actuates an output after a desired count has been reached.

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

DAC

Digital to Analogue Converter

DAR

Delayed auto-reclose

DAT

Digital Audio Tape

DBMS

Data Base Management system

DCF77

LF transmitter located at Mainflingen, Germany, broadcasting a time signal on a 77.5kHz frequency

DCP

Device Control Point: local keypad on device level to control the switchgear, often combined with local/remote switch

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

Dependent time measuring relay

A measuring relay for which times depend, in a specified manner, on the value of the characteristic quantity

DFT

Discrete Fourier Transform

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

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

Directional relay

A protection relay in which the tripping decision is dependent in part upon the direction in which the measured quantity is flowing

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

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

DNP

Distributed Network Protocol. A proprietary communication protocol used on secondary networks between HMI, substation computers or Bay Computers and protective devices

DOL

Direct-on-Line

Direct-on-Line

A method of motor starting, in which full line voltage is applied to a stationary motor

Drop-out (or drop-off)

A relay drops out when it moves from the energised position to the un-energised position

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

DSP

Digital Signal Processing

DT

Definite time

Earth fault protection system

A protection system which is designed to respond only to faults to earth

Earthing transformer

A three-phase transformer intended essentially to provide a neutral point to a power system for the purpose of earthing

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

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

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

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

EMC

Electro-Magnetic Compatibility

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

e.m.f.

Electro-motive Force (or voltage)

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

Event

An event is any information acquired or produced by the digital control system

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

FBD

Functional Block Diagram: One of the IEC 61131-3 programming languages

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 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.)

FPI

Fault Passage Indicator

Frequency transducer

A transducer used for the measurement of the frequency of an a.c. electrical quantity

Full duplex communications

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

GIS

Gas Insulated Switchgear (usually SF6)

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

GMT

Greenwich Mean Time

GPS

Global Positioning System

GTO

Gate Turn-off Thyristor

Half- duplex communications

A communications system in which data can travel in both directions, but only in one direction at a time

High-speed reclosing

A reclosing scheme where re-closure is carried out without any time delay other than that required for de-ionisation, etc.

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

HRC

High Rupturing Capacity (applicable to fuses)

HSR

High Speed Reclosing

HV

High Voltage

HVDC

High Voltage Direct Current

I

Current

ICCP

Term used for IEC 60870-6-603 protocol

ICT

Interposing Current Transformer (software implemented)

I.D.M.T.

Inverse Definite Minimum Time

IGBT

Insulated Gate Bipolar Transistor

I/O

Input/Output

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

IGBT

Insulated Gate Bipolar Transistor

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

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

Input quantity

The quantity, or one of the quantities, which constitute the signals received by the transducer from the measured system

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

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

Intrinsic error

An error determined when the transducer is under reference conditions

Inverse time delay relay

A dependent time delay relay having an operating time which is an inverse function of the electrical characteristic quantity

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

IRIG-B

An international standard for time synchronisation

ISO

International Standards Organisation

K-bus (K-bus Courier)

Term used for the Courier protocol on K-Bus interface for K-Relay range manufactured by AREVA

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%

L

Inductance

LAN

Local Area Network

LCD

Liquid Crystal Display

LED

Light Emitting Diode

LD

Ladder Diagram. One of the IEC 61131-3 programming languages

LDC

Line drop compensator

Limiting value of the output current

The upper limit of output current which cannot, by design, be exceeded under any conditions

Local Control Mode

When set for a given control point it means that the commands can be issued from this point

Lock-out (auto-reclose)

Prevention of a CB reclosing after tripping

Long-term stability

The stability over a period of one year

Low-speed auto-reclose

See Delayed Auto-Reclose

LV

Low Voltage

Main protection

The protection system which is normally expected to operate in response to a fault in the protected zone

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

MCB

Miniature Circuit Breaker

MCCB

Moulded Case Circuit Breaker

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

Measurand

A quantity subjected to measurement

Measuring element

A unit or module of a transducer which converts the measurand, or part of the measurand, into a corresponding signal

Measuring range

That part of the span where the performance complies with the accuracy requirements

Measuring relay

An electrical relay intended to switch when its characteristic quantity, under specified conditions and with a specified accuracy attains its operating value

Metering (non-tariff)

Values computed depending on the values of digital or analogue inputs during variable periods

Metering (tariff)

Energy values computed from digital and/or analogue inputs during variable periods and dedicated to energy measurement for billing (tariff) purposes

Mid Point Sectioning Substation

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

ModBus

Proprietary communication protocol used on secondary networks between HMI, substation computers or Bay Computers and protective devices

MPSS

Mid Point Sectioning Substation (electrified railways)

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

Multi-section transducer

A transducer having two or more independent measuring circuits for one or more functions

Multi-shot reclosing

A reclosing scheme that permits more than one reclosing operation of a CB after a fault occurs before lock-out occurs

MV

Medium Voltage

N/C

Normally Closed

N/O

Normally Open

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

Notching relay

A relay which switches in response to a specific number of applied impulses

NPS

Negative Phase Sequence

NS

Neutral Section (electrified railways)

Numerical relay

A protection relay which utilises a Digital Signal Processor to execute the protection algorithms in software

OCB

Oil Circuit Breaker

Off-Load Tap Changer

A tap changer that is not designed for operation while the transformer is supplying load

OHL

Overhead line

OLTC

On Load Tap Changer.

On Load Tap Changer

A tap changer that can be operated while the transformer is supplying load.

Opening time

The time between energisation of a CB trip coil and the instant of contact parting

Operating current (of a relay)

The current at which a relay will pick up

Operating time (CB)

The time between energisation of a CB trip coil and arc extinction

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

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.

Output common mode interference voltage

An unwanted alternating voltage which exists between each of the output terminals and a reference point

Output current (of a transducer)

The current produced by the transducer which is an analogue function of the measurand

Output load

The total effective resistance of the circuits and apparatus connected externally across the output terminals

Output power (of a transducer)

The power available at the transducer output terminals

Output series mode interference voltage

An unwanted alternating voltage appearing in series between the output terminals and the load

Output signal

An analogue or digital representation of the measurand

Output span (span)

The algebraic difference between the lower and upper nominal values of the output signal

Overcurrent relay

A protection relay whose tripping decision is related to the degree by which the measured current exceeds a set value.

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

Parametric conjunctive test

A conjunctive test that ascertains the range of values of each parameter for which the test meets specific performance requirements

PCB

Printed Circuit Board

PCC

Point of Common Coupling

PED

Power Electronic Device

Phase angle transducer

A transducer used for the measurement of the phase angle between two a.c. electrical quantities having the same frequency

Pick-up

A relay is said to 'pick-up' when it changes from the de-energised position to the energised position

Pilot channel

A means of interconnection between relaying points for the purpose of protection

PLC

Programmable Logic Controller. A specialised computer for implementing control sequences using software

PLCC

Power Line Carrier Communication

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 moment of switching to minimise the effects (inrush currents, overvoltages)

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

Power factor

The factor by which it is necessary to multiply the product of the voltage and current to obtain the active power

Power Line Carrier Communication

A mean of transmitting information over a power transmission line by using a carrier frequency superimposed on the normal power frequency.

PPS

Positive Phase Sequence

Protected zone

The portion of a power system protected by a given protection system or a part of that protection system

Protection equipment

The apparatus, including protection relays, transformers and ancillary equipment, for use in a protection system

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

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

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

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.

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

PSTN

Public Switched Telephone Network

PT100

Platinum resistance temperature probe

R

Resistance

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

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

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

RCD

Residual Current Device. A protection device which is actuated by the residual current

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

Reactive power (var) transducer

A transducer used for the measurement of reactive electrical power

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

REF

Restricted Earth Fault

Reference conditions

Conditions of use for a transducer prescribed for performance testing, or to ensure valid comparison of results of measurement

Reference range

A specified range of values of an influence quantity within which the transducer complies with the requirements concerning intrinsic errors

Reference value

A specified single value of an influence quantity at which the transducer complies with the requirements concerning intrinsic errors

Relay

See Protection relay

Resetting value

The limiting value of the characteristic quantity at which the relay returns to its initial position

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

Reversible output current

An output current which reverses polarity in response to a change of sign or direction of the measurand

Ripple content of the output

With steady-state input conditions, the peak-to-peak value of the fluctuating component of the output

r.m.s.

Root Mean Square

RMU

Ring Main Unit

ROCOF

Rate Of Change Of Frequency (protection relay)

RSVC

Relocatable Static Var Compensator

RTD

Resistance Temperature Detector

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

SCADA

Supervisory Control and Data Acquisition

SCL

Substation Configuration Language. Normalised configuration language for substation modelling (as expected by IEC 61850-6)

SCP

Substation Control Point. HMI computers at substation level allowing the operators to control the substation

SCS

Substation Control System

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

SFC

Sequential Function Chart: One of the IEC 61131-3 programming languages

Short-term stability

The stability over a period of 24 hours

Simplex communications system

A communications system in which data can only travel in one direction

Single-shot reclosing

An auto-reclose sequence that provides only one reclosing operation, lock-out of the CB occurring if it subsequently trips

S.I.R.

System Impedance Ratio

Single element transducer

A transducer having one measuring element

SOE

Sequence Of Events

SOTF

Switch on to Fault (protection)

Specific conjunctive test

A conjunctive test using specific values of each of the parameters

Spring winding time

For spring-closed CB's, the time for the spring to be fully charged after a closing operation

ST

Structured Text: One of the IEC 61131-3 programming languages

Stability (of a transducer)

The ability of a transducer to keep its performance characteristics unchanged during a specified time, all conditions remaining constant

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

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

Starting relay

A unit relay which responds to abnormal conditions and initiates the operation of other elements of the protection system

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

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

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

STC

Short Time Current (rating of a CT)

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

SVC

Static Var Compensator

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

Term used for IEC 60870-5-101 protocol

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

TCP/IP

Transmission Control Protocol/Internet Protocol. A common protocol for the transmission of messages over the Internet

TCS

Trip Circuit Supervision

TC57

Technical Committee 57 working for the IEC and responsible for producing standards in the field of Protection (e.g. IEC 61850)

TF

- a) Transfer Function of a device (usually an element of a control system)
- b) Transient Factor (of a CT)

Through fault current

The current flowing through a protected zone to a fault beyond that zone

Time delay

A delay intentionally introduced into the operation of a relay system

Time delay relay

A relay having an intentional delaying device

TPI

Tap Position Indicator (for transformers)

Transducer (electrical measuring transducer)

A device that provides a d.c. output quantity having a definite relationship to the a.c. measurand

Transducer with offset zero (live zero)

A transducer which gives a predetermined output other than zero when the measurand is zero

Transducer with suppressed zero

A transducer whose output is zero when the measurand is less than a certain value

Unit electrical relay

A single relay that can be used alone or in combinations with others

Unit protection

A protection system that is designed to operate only for abnormal conditions within a clearly defined zone of the power system

Unrestricted protection

A protection system which has no clearly defined zone of operation and which achieves selective operation only by time grading

UCA

Utility Communications Architecture

UPS

Uninterruptible Power Supply

UTC

Universal Time Coordinates

V

Voltage

VCB

Vacuum Circuit Breaker

VDEW

Term used for IEC 60870-5-103 protocol. The VDEW protocol is a subset of the IEC 60870-5-103 protocol

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

Voltage transducer

A transducer used for the measurement of a.c. voltage

VT

Voltage Transformer

X

Reactance

Z

Impedance