PDIF
27
46
DIFFERENTIAL
NEGATIVE-SEQUENCE
51N
67
21
PIOC
UNDERVOLTAGE
OVERCURRENT
AUTORECLOSE
RREC
EARTH FAULT
DISTANCE
79
PTOC
DIRECTIONAL
PTUV
PDIS
87

AX2

ANSI & IEC
Function References

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Appendix

AX2

ANSI & IEC Function References

There are three methods for indicating protection relay functions in common use. One is using Logical Nodes from the IEC 61850 standard, one is given in ANSI Standard C37-2, and uses a numbering system for various functions plus additional letters when further clarification is required. The last one is given in IEC 60617, and uses graphical symbols with the operating quantity symbol. To assist the Protection Engineer in converting from one system to the other, a cross reference list of IEC LN, ANSI device numbers and their IEC equivalents is given in Figure AX2.1.

Description	IEC 61850	ANSI	IEC 60617
Overspeed relay	PZSO *)	12	$\omega >$
Underspeed relay	PZSU	14	$\omega <$
Distance relay	PDIS	21	$Z <$
Overtemperature relay	PTTR	26	$\theta >$
Undervoltage relay	PTUV	27	$U <$
Directional overpower relay	PDOP	32	$\overset{\longrightarrow}{P >}$
Underpower relay	PDUP	37	$P <$
Undercurrent relay	PTUC	37	$I <$
Negative sequence overcurrent relay	PTOC	46	$I_2 >$
Negative sequence overvoltage relay	PTOV	47	$U_2 >$
Thermal relay	PTTR	49	
Instantaneous overcurrent relay	PIOC	50	$I >>$
Inverse time overcurrent relay	PTOC	51	$I >$

Description	IEC 61850	ANSI	IEC 60617
Inverse time earth fault overcurrent relay	PTOC	51G	$I\overset{\perp}{=}>$
Definite time earth fault overcurrent relay	PTOC	51N	$I\overset{\perp}{=}>$
Voltage restrained/controlled overcurrent relay	PVOC	51V	$U/I >$
Power factor relay	POPF / PUPF	55	$cos\ \varphi >$
Overvoltage relay	PTOV	59	$U >$
Neutral point displacement relay	PTOV	59N	$U_{rsd} >$
Earth-fault relay	PTOC	64	$I\overset{\perp}{=}>$
Directional overcurrent relay	PTOC	67	$\overset{\longrightarrow}{I >}$
Directional earth fault relay	PTOC	67N	$\overset{\longrightarrow}{I\overset{\perp}{=}>}$
Phase angle relay	PPAM	78	$\varphi >$
Autoreclose relay	RREC	79	$0 \rightarrow 1$
Underfrequency relay	PTUF	81U	$f <$
Overfrequency relay	PTOF	81O	$f >$
Differential relay	PDIF	87	$I_d >$

Figure AX2.1:
IEC 61850 / ANSI number / IEC symbol comparison

) proposed, but not standardized