LIST OF SYMBOLS, ABBREVIATIONS AND NOMENCLATURE

AC	Alternating current
DC	Direct current
PQ	Power quality
Hz	Hertz
PCC	Point of common coupling
V_n	Per unit voltage of n^{th} harmonic voltage with respect to fundamental
THD	Total harmonic distortion
I_{SC}	Maximum short circuit current at PCC
I_L	Maximum load current at PCC
I_n	Current due to n^{th} harmonic
R	Resistance
L	Inductance
C	Capacitance
Q_L	Quality factor
R_S	Source resistance
L_S	Source inductance
Z_S	Source impedance
CSC	Current source converter
VSC	Voltage source converter
APF	Active power filter
UPQC	Unified power quality conditioners
L_{dc}	DC link inductor
C_{dc}	DC link capacitor
L_{hf}	High pass filter inductance
C_{hf}	High pass filter capacitance
R_{hf}	High pass filter resistance

X_{hf}	High pass filter inductive reactance
i_S	Source current
l_L	Load current
l_C	Compensator current
L_L	Load inductance
v_{af}	Series APF output voltage
BJT	Bipolar transistors
GTO	Gate turn-off thyristors
IGBT	Insulated gate bipolar transistors
PWM	Pulse width modulation
EAF	Electric arc furnace
PF	Passive filter
CF	Composite filter/hybrid filter
V	Voltage
A	Ampere
VA	Volt-ampere
VAr	Volt-ampere-reactive
RMS	Route mean square
THD_V	Total voltage harmonic distortion
THD_I	Total current harmonic distortion
VIC	Voltage current characteristic
h	Harmonic order
n	Transformation ratio/constant
V_{ph}	Voltage per phase
V_1	Fundamental voltage
I_1	Fundamental current
i	Arc current
v	Arc voltage
g	Arc conductance
E_0	Momentarily constant steady state arc voltage

θ	Arc time constant
θ_0	Constant
θ_1	Constant
α	Constant
P_0	Momentarily power loss
I_0	Transition current
$g_{\min}$	Minimum conductance
V_{at}	Threshold voltage
hyp	Hyperbolic (subscript)
$\exp$	Exponential (subscript)
com	Combined (subscript)
V_{at0}	Initial value of threshold voltage
A	Arc voltage
B	Arc voltage per unit arc length
C	Arc power
D	Arc current
I_o	Current constant
$O(i)$	Transition function
I_t	Maximum value of arc current variation
V	Voltage per phase
f	Supply frequency
Z_S	System impedance/source impedance
Z_{ft}	Furnace transformer impedance
l	Arc length
m	Modulation index
t	Time in seconds
ω	Angular frequency
ω_f	Flicker frequency
$N(t)$	Band limited white noise

S	Apparent power
P	Active power
Q	Reactive Power
pf	Power factor
SLD	Single line diagram
RM	Rolling mill
V_{1P}	Lower peak of modulating voltage
V_{2P}	Upper peak of modulating voltage
v_s	Source voltage
V_P	Primary voltage
V_S	Secondary voltage
R_c	Cable resistance
L_c	Cable capacitance
R_d	Drive resistance
L_d	Drive inductance
C_d	Drive capacitance
E_d	Back emf
α	Firing angle
D_1 *to* D_6	Diodes
T_1	Distribution transformer
T_2	Furnace transformer
T_3 and T_4	Auxiliary transformers
K	Proportionality constant
VSI	Voltage source inverter
v_c	Controlled inverter output voltage/voltage in the secondary of the coupling transformer
R_e	Equivalent resistance
$\bar{v}$	Voltage vector
$\bar{i}$	Current vector
I_1	Fundamental current value

$\bar{i}_{\alpha\beta}$	Current vector in $\alpha\beta$ coordinates
$\bar{v}_{\alpha\beta}$	Voltage vector in $\alpha\beta$ coordinates
p_L	Real instantaneous power of load
q_L	Imaginary instantaneous power of load
p_s	Real instantaneous power of source
p_c	Real instantaneous power of compensator
P_L	Average real power of load
P_s	Average real power of source
I_1^{+2}	Square RMS value of positive sequence fundamental component
ALPF	All pass filter
LPF	Low pass filter
V_{dc}	DC bus voltage
i_F	Filter current
R_F	Filter resistance
L_F	Filter inductance
C_F	Filter capacitance
Z_F	Filter impedance
Z_L	Load impedance
X_L	Inductive reactance
X_C	Capacitive reactance
f_o	Resonant frequency
L_f	Second order low pass filter inductance
C_f	Second order low pass filter capacitance
$\boldsymbol{v}_L$	Load voltage vector
$\boldsymbol{i}_L$	Source current vector
i_f	Inductor current through L_f
$v_c^*(t)$	Input reference voltage

v_o	Output voltage seen by the load
v_{sf}	Fundamental components of source voltage
v_{sh}	Harmonic components of source voltage
v_{lf}	Fundamental components of load voltage
v_{lh}	Harmonic components of load voltage
i_{lf}	Fundamental components of load current
i_{lh}	Harmonic components of load current
$k(s)$	Open loop transfer function
$k_c(s)$	Transfer function of the sensor modulating circuit.
k_c	Gain of sensor modulating circuit
T_c	Time constant of sensor modulating circuit
$A(s)$	Transfer function of the harmonics calculating circuit.
m	Internal gain of harmonic calculating circuit
K_{PWM}	Inverter gain
$k_v(s)$	Transfer function of the inverter.
k_v	Gain determined by the speed of the processor/related software
T_v	Time constant determined by the speed of the processor/related software
$k_f(s)$	Transfer function of the output carrier filter circuit
ξ	Damping factor
f_v	Carrier frequency
f_{cf}	Cross-over frequency
S_L	Load apparent output
V_L	Load voltage per phase
S_{SAPF}	SAPF apparent power
V_{ph}	Voltage per phase
Q_F	Reactive power provided by filter

*	Reference signal (superscript)