ALTERNATOR TECHNICAL DESCRIPTION
LSA 52.3 L4 / 4p

LS Reference: OF241039_3.3KV_1110KVA

Date: 10-28-2024

V6.10 - 12/2023

Project Manager : Aviva
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Leroy-Somer
Electric Power Generation - Fuzhou
No.1 Aimosheng Road, Gaishan Town, Cangshan District - Fuzhou, Fujian | 350026 | P.R. China
PH

Main data					C
Generator type:	**LSA 52.3 L4 / 4p**				
Power:	1 110	kVA	888 kWe	929 kWm	
Voltage:	3 300	V	Star serial		
Rated voltage range:	+5/-5%				
Power factor - Lagging:	0.8				
Frequency:	50	Hz			
Speed:	1 500	rpm			
Nominal current:	194	A			
Winding type:	p5/6				
Classes (Insulation / Temperature Rise):	H / F				
Ambient temperature:	40	°C			
Altitude:	1 000	m			

Installation	IEC	Quantity	1
Client:	Vertgroup		
Prime mover:	Reciprocating engine		
Manufacturer:	-		
Type:	-		
Duty:	Base Rating		

Mechanical construction			IM1201
Type of construction:	Single bearing		
Mounting arrangement:	Horizontal Axis		
Direction of rotation:	Clockwise (seen when facing the drive end - DE)		
Bearing type:	Anti-friction		
Bearing Lubrication:	Regreasable		
Bearing insulation:	Not insulated		
Flector type:	SAE 21		
Balancing - Class (ISO 21940-11):	Without key - G2,5 (std)		
Flange:	SAE 00		
Shaft height:	500	mm	
Width:	750	mm	

Additional specificities		
Stabilized Runaway speed:	1 800	rpm - 2 min.

Cooling Method		IC01
Degree of protection:	IP23	
Coolant:	Air / Temperature: 40 °C	
Air quality:	Clean	
Ventilation (internal):	Self-ventilated	
Filters:	Without	
Ducting for air inlet:	No	
Ducting for air outlet:	No	

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Connection, Excitation & Regulation

Parallel operation:	Between alternators (1F) - 1 x Droop CT	1
Excitation:	Self-excited - Brushless - Type: AREP + PMI	1
Sustained 3-phase Isc:	> 3 x FLC for 10s.	1
AVR type:	Leroy Somer - D550 - Digital	1
AVR location:	In terminal box	1
Alternator Voltage sensing:	Terminal box mounted voltage sensing VTs	1

Terminal box

Power connection:	4 connectors (brought out neutral)	1
Main terminal box location:	1 terminal box on the top	1
Line side outlet:	Left hand side (seen when facing the drive end - D)	1
Gland plate:	Non magnetic, Undrilled	1
Auxiliaries	In main terminal box	1
	-	1

Protection and measurement accessories 1

Temperature detection 1

Stator windings:	6 x PT100 (3 wires)	1
Guide bearing - NDE:	1 x PT100 per bearing (3 wires)	1

Anti-condensation heating 1

	Voltage: 230 V - 1Ph / Power: 500 W	1

Various items

Paint:	PE - Primary - ---	1
Documentation:	PDF manual	1
Documentation Language:	English	1
Nameplate	Sticker	1

Controls

Standards:	IEC	1
QUAL/INES/006 001 => 101	Measurement of winding resistance	1
QUAL/INES/006 021 => 128	Insulation check on sensors (when fitted)	1
QUAL/INES/006 002 => 102&103	Voltage balance and phase order check	1
QUAL/INES/006 007 => 109	Overspeed test (according to test bench limitation)	1
QUAL/INES/006 009 => 111	High potential test	1
QUAL/INES/006 010 => 112	Insulation resistance measurement	1

ALTERNATOR ELECTRICAL DATA
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Date: 10-28-2024 V6.10 - 12/2023

Main data: C

Power:	**1 110**	kVA	**888**	kWe	**929**	kWm
Voltage:	**3300**	V	Frequency:		**50**	Hz
Rated voltage range:	+5% / -5%		Speed:		1500	rpm
Power factor - Lagging:	0.8					
Nominal current:	194	A	Phases		3	
Insulation / Temperature rise:	H / F		Connexion		Star serial	
Cooling:	**IC01**		Winding type:		p5/6	
			Winding:		- 6 Wires	
Ambient temperature:	40	°C				
Altitude:	1000	m	Overspeed (rpm)		1800	
Duty: Base Rating			Total Harmonic Distortion (THD) < 1.5%			

Efficiency (Base 888 kWe) IEC

	25%	50%	75%	**100%**	110%
Power factor - Lagging: 0.8	93.37	95.46	95.76	**95.60**	95.48
Power factor - Lagging: 1	93.99	96.31	96.82	**96.88**	96.85

Reactances (%) - (Base 1110 kVA)

Unitary impedance (1 per unit) = 9.810811 ohms

		Direct axis *Unsaturated*	Direct axis *Saturated*		Quadrature axis *Unsaturated*	Quadrature axis *Saturated*
Synchronous reactance	Xd	220	206	Xq	112	105
Transient reactance	X'd	27.2	23.1	X'q	112	105
Subtransient reactance	X"d	14.8	12.6	X"q	15.2	12.9
Negative sequence reactance	X2	15.0	12.7			

X0	7.5	Zero sequence reactance
Xl	7.4	Stator leakage reactance
Xr	21.9	Rotor leakage reactance
Kc	**0.49**	Short-circuit ratio

Time constants (s)

	Direct axis		Quadrature axis	
Open circuit transient time constant	T'do	1.42	T'qo	NA
Short-circuit transient time constant	T'd	0.176	T'q	NA
Open circuit subtransient time constant	T"do	0.024	T"qo	0.086
Subtransient time constant	T"d	0.013	T"q	0.012

Ta 0.030 Armature winding short circuit time constant

Resistances (%)

Ra	1.6	Armature resistance	R0	2.5	Zero sequence resistance
X/R	7.9	X/R ratio (without unit)	R2	3.0	Negative sequence resistance

Voltage accuracy: 0.25%
Maximum inrush current for a voltage dip of 15%: 800 kVA
when starting an AC motor having a starting power factor between 0 and 0.4

Rating is provided for the specified temperature rise, by resistance measurement according to IEC60034-1
According to: I.E.C. 60034.1 - 60034.2 - NEMA MG 1-32

#REF!

ALTERNATOR MAIN CURVES
LSA 52.3 L4 / 4P

LS Reference: OF241039_3.3KV_1110KVA

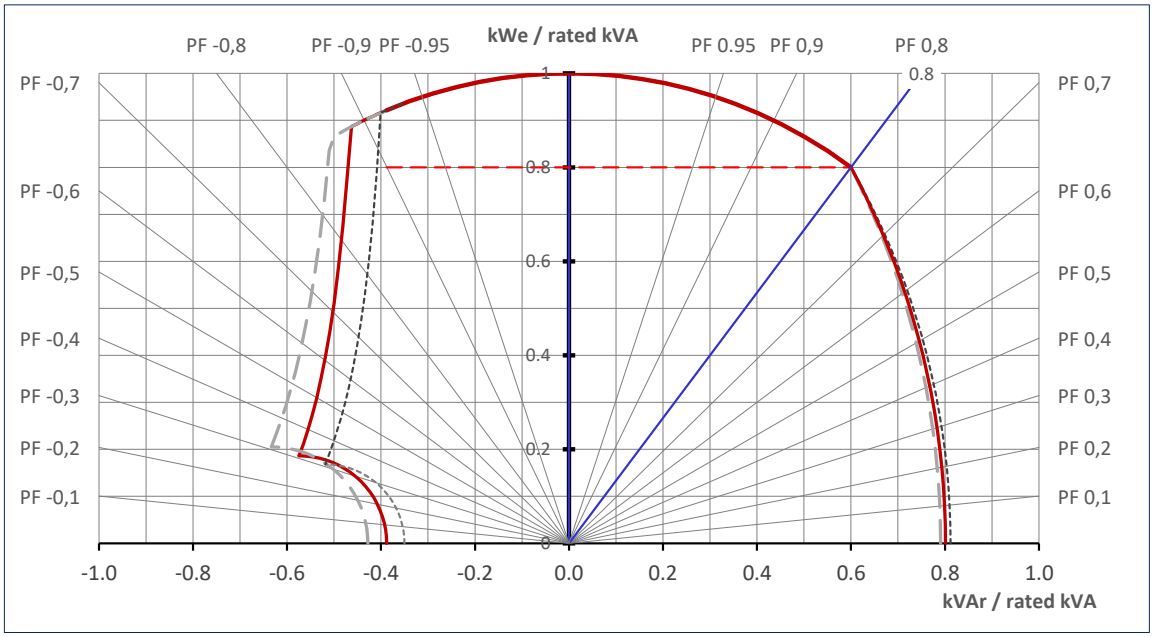
Date: 10-28-2024

1110kVA - 3300V - 50 Hz

V6.10 - 12/2023

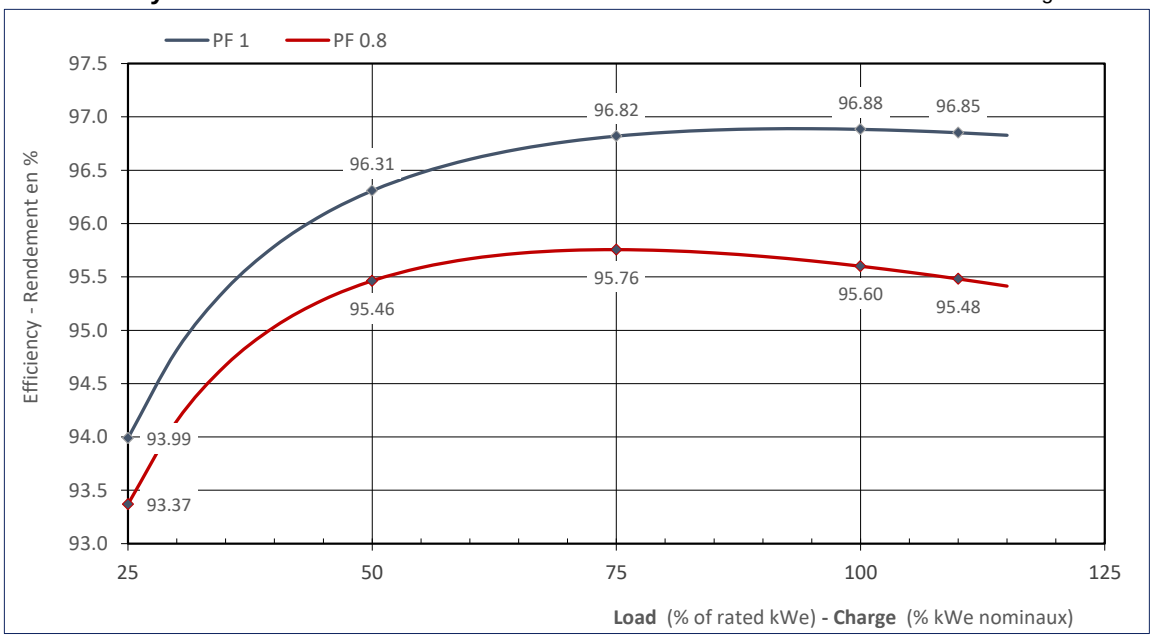
Capability Curve

Umax	+ 5%	3 465	V
Un		**3 300**	V
Umin	- 5%	3 135	V



Efficiency Curves

According to: IEC



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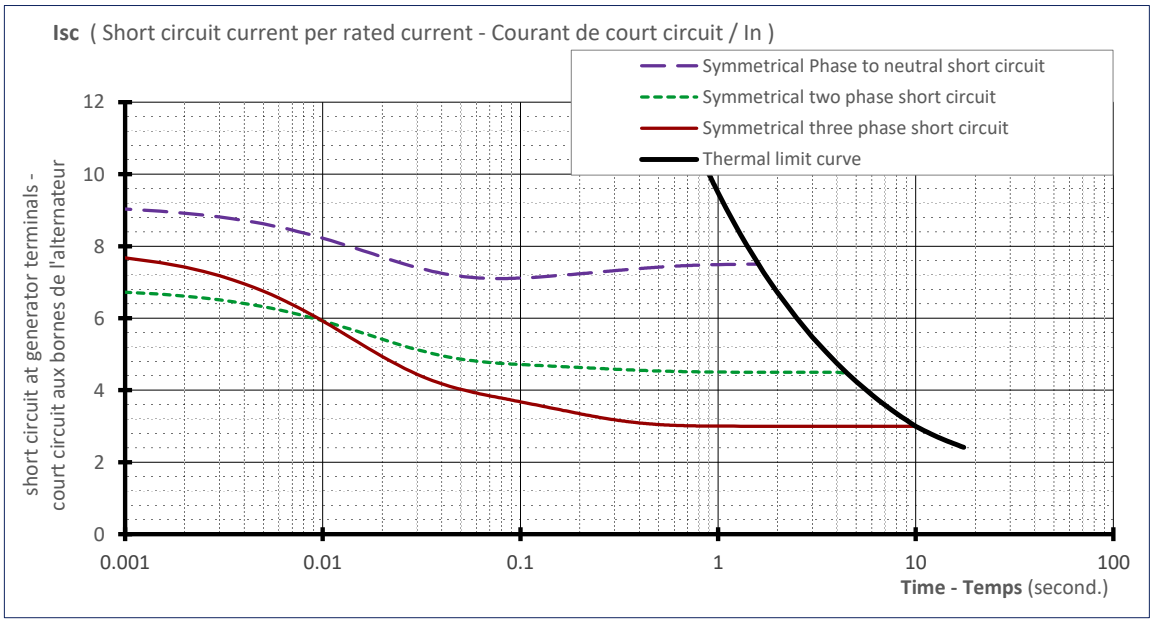
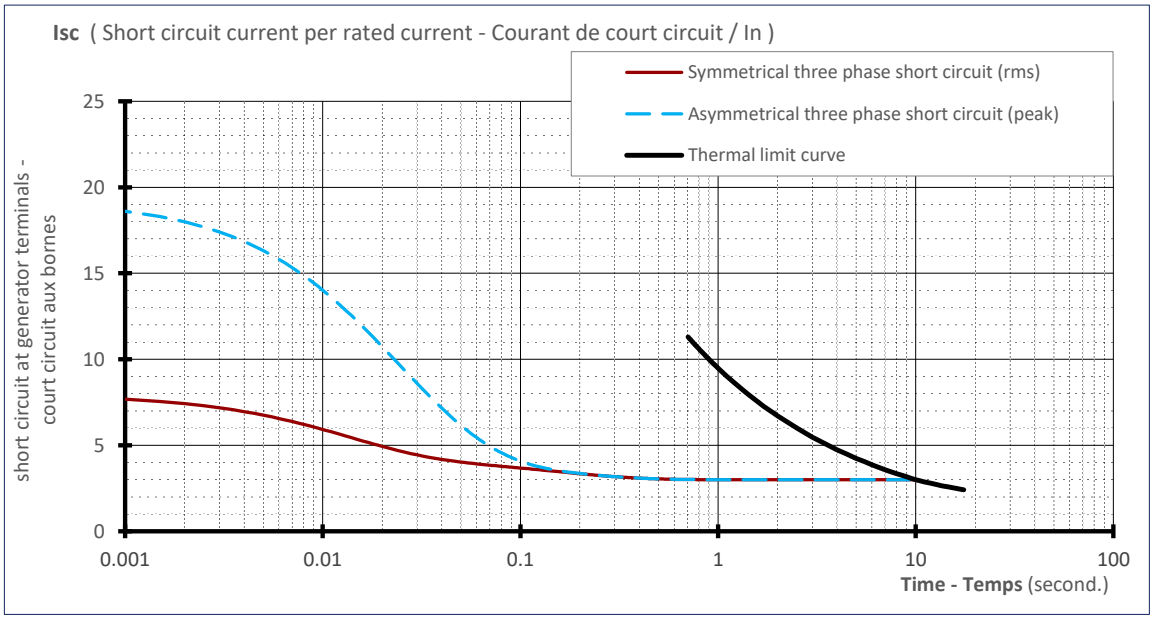
Stator Current decrement curves

Symmetrical phase to neutral short-circ	initial	1 752	A	9 x In			
Symmetrical two phase short-circuit	max	1 304	A	6.7 x In	In =	**194**	A
Symmetrical three phase short-circuit	value	1 489	A	7.7 x In			
Thermal Limit							



Asymmetrical three phase short-circuit	IP	3 576	A	18.4 x In			



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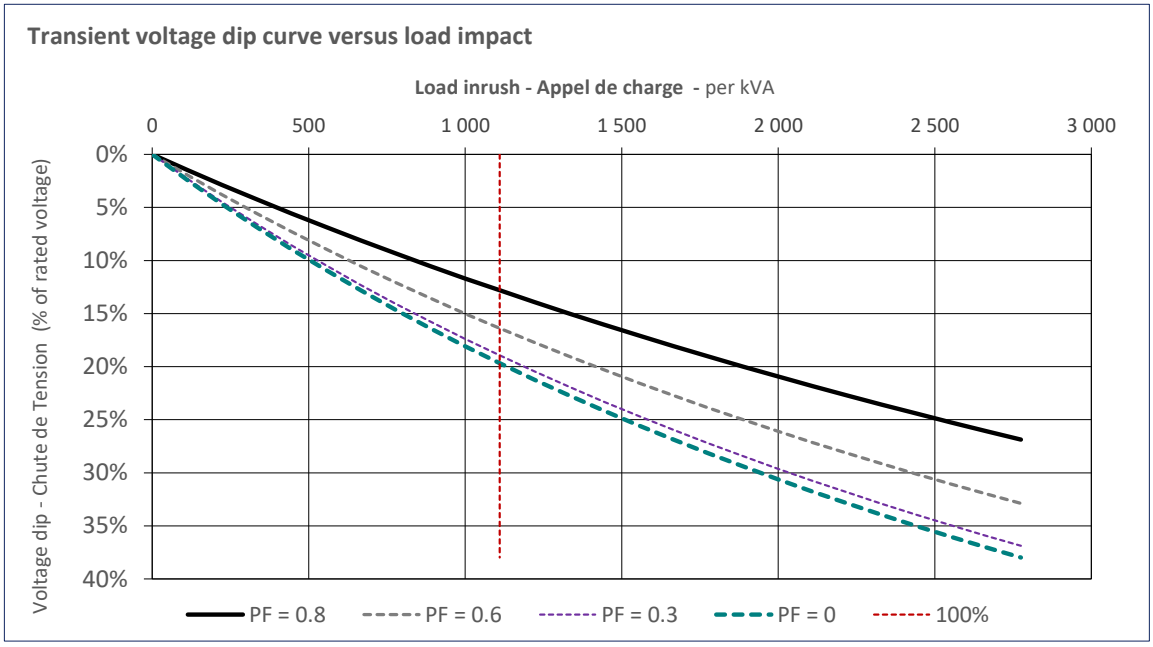
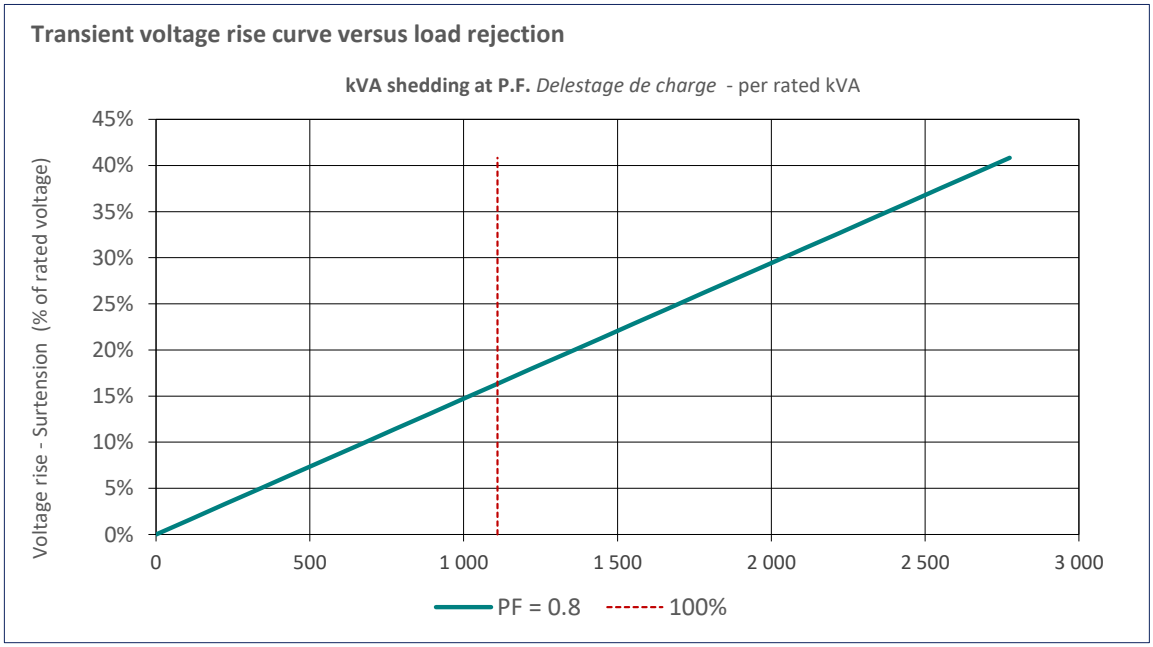
Transient Voltage Variation





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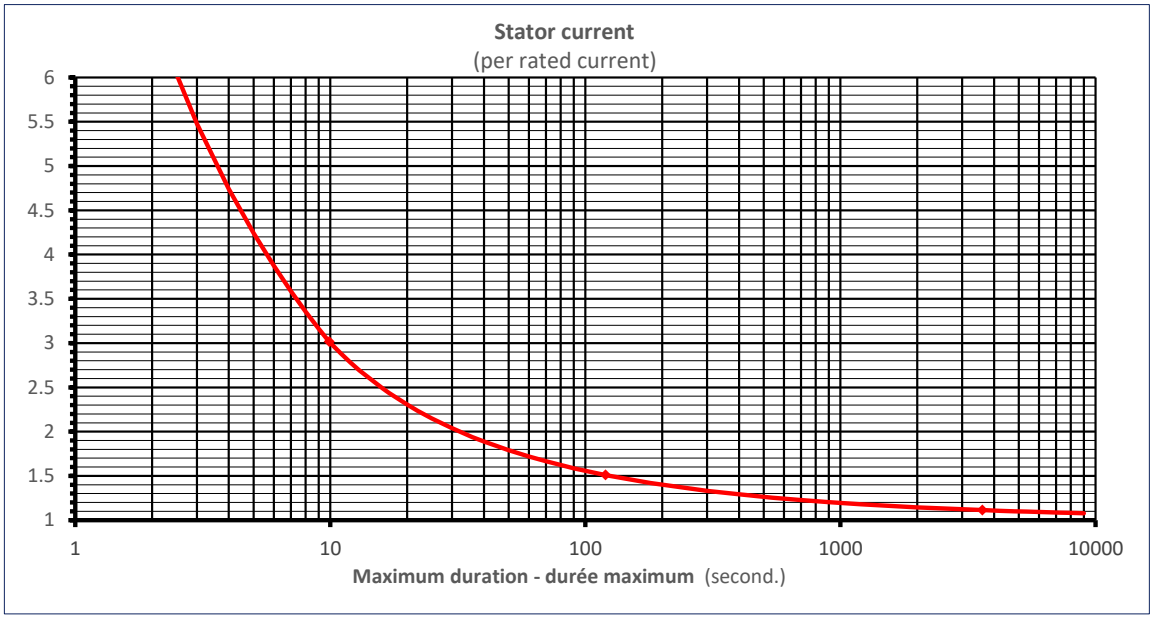
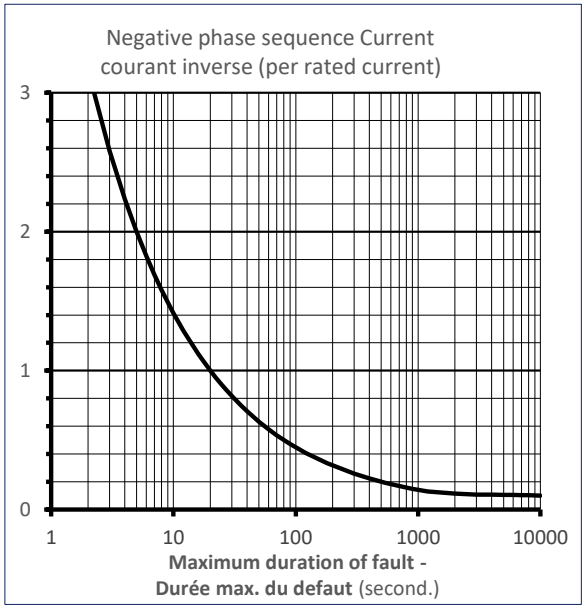
Thermal Damage Curve



Unbalance Load Curve



Stator Earth Fault Current