

ALTERNATOR TECHNICAL DESCRIPTION

LSA 53.2 M7 / 4p

LS Reference: OF241039_LSA53.2M7 3.3KV_2100KVA 1

Date:	10-28-2024	V6.10 - 12/2023	1
		Project Manager : Aviva	1
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Electric Power Generation - Fuzhou		+86 (591)88373034	
No.1 Aimosheng Road, Gaishan Town, Cangshan District - Fuzhou, Fujian 350026 P.R. China		PH	

Main data C 1

Generator type:	LSA 53.2 M7 / 4p			1
Power:	2 100 kVA	1 680 kWe	1 748 kWm	1
Voltage:	3 300 V	Star serial		1
Rated voltage range:	+5/-5%			1
Power factor - Lagging:	0.8			1
Frequency:	50 Hz			1
Speed:	1 500 rpm			1
Nominal current:	367 A			1
Winding type:	p5/6			1
Classes (Insulation / Temperature Rise):	H / F			1
Ambient temperature:	40 °C			1
Altitude:	1 000 m			1

Installation IEC Quantity 1 1

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

Mechanical construction IM1201 1

Type of construction:	Single bearing	1
Mounting arrangement:	Horizontal Axis	1
Direction of rotation:	Clockwise (seen when facing the drive end - DE)	1
Bearing type:	Anti-friction	1
Bearing Lubrication:	Regreasable	1
Bearing insulation:	Not insulated	1
Flector type:	SAE 21	1
Balancing - Class (ISO 21940-11):	Without key - G2,5 (std)	1
Flange:	SAE 00	1
Shaft height:	500 mm	1
Width:	750 mm	1

Additional specificities 1

Stabilized Runaway speed:	1 800 rpm - 2 min.	1
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Cooling Method IC01 1

Degree of protection:	IP23	1
Coolant:	Air / Temperature: 40 °C	1
Air quality:	Clean	1
Ventilation (internal):	Self-ventilated	1
Filters:	Without	1
Ducting for air inlet:	No	1
Ducting for air outlet:	No	1

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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

Protection and measurement accessories

Temperature detection

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

Anti-condensation heating

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

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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V6.10 - 12/2023

Main data: C

Power:	2 100 kVA	1 680 kW _e	1 748 kW _m	1
Voltage:	3300 V	Frequency:	50 Hz	1
Rated voltage range:	+5% / -5%	Speed:	1500 rpm	1
Power factor - Lagging:	0.8			1
Nominal current:	367 A	Phases	3	1
Insulation / Temperature rise:	H / F	Connexion	Star serial	1
Cooling:	IC01	Winding type:	p5/6	1
		Winding:	- 6 Wires	1
Ambient temperature:	40 °C			1
Altitude:	1000 m	Overspeed (rpm)	1800	1
Duty: Base Rating		Total Harmonic Distortion (THD)	< 1.5%	1

Efficiency (Base 1680 kW_e) IEC

	25%	50%	75%	100%	110%	
Power factor - Lagging: 0.8	94.81	96.30	96.37	96.11	95.96	1
Power factor - Lagging: 1	95.24	96.97	97.26	97.22	97.16	1

Reactances (%) - (Base 2100 kVA)

Unitary impedance (1 per unit) = 5.185714 ohms

		Unsaturated		Saturated		
	Direct axis					Quadrature axis
Synchronous reactance	X _d	330	313	X _q	168	159
Transient reactance	X' _d	36.3	30.9	X' _q	168	159
Subtransient reactance	X'' _d	20.9	17.8	X'' _q	21.9	18.6
Negative sequence reactance	X ₂	21.4	18.2			
X ₀	13.3	Zero sequence reactance				
X _l	10.5	Stator leakage reactance				
X _r	28.1	Rotor leakage reactance				
K_c	0.32	Short-circuit ratio				

Time constants (s)

	Direct axis	Quadrature axis
Open circuit transient time constant	T' _{do} 2.90	T' _{qo} NA
Short-circuit transient time constant	T' _d 0.319	T' _q NA
Open circuit subtransient time constant	T'' _{do} 0.038	T'' _{qo} 0.152
Subtransient time constant	T'' _d 0.022	T'' _q 0.020
T _a 0.040	Armature winding short circuit time constant	

Resistances (%)

R _a 1.7	Armature resistance	R ₀ 4.4	Zero sequence resistance
X/R 10.4	X/R ratio (without unit)	R ₂ 4.3	Negative sequence resistance

Voltage accuracy: 0.25%

Maximum inrush current for a voltage dip of 15%: 1134 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

Products and materials shown in this catalogue may, at any time, be modified in order to follow the latest technological developments.

#REF!

ALTERNATOR MAIN CURVES

LSA 53.2 M7 / 4P

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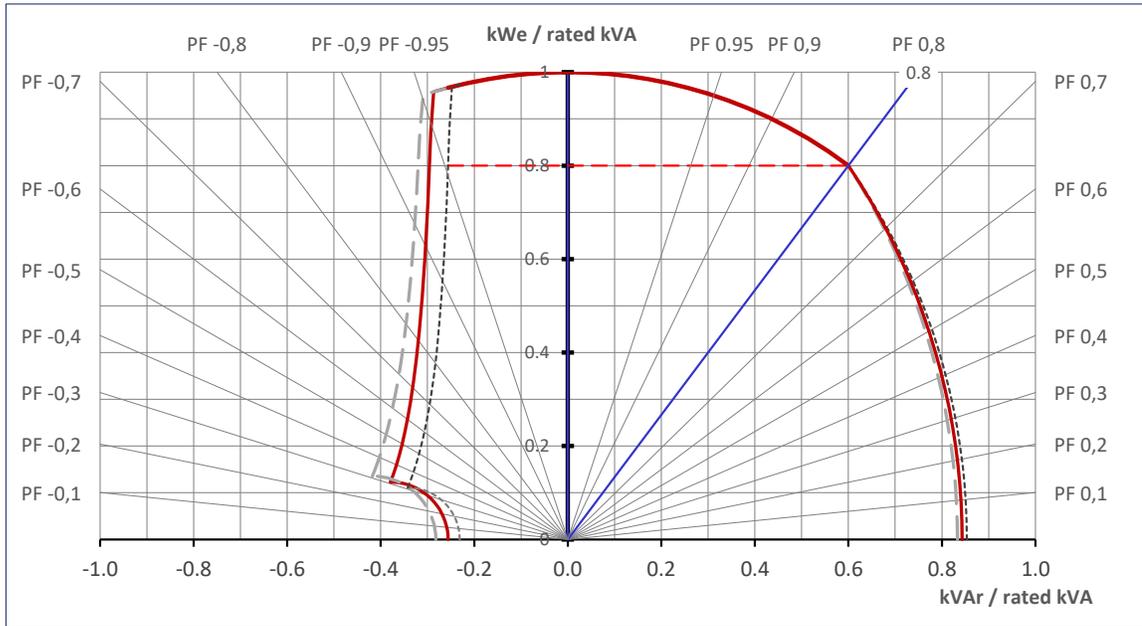
Date: 10-28-2024

2100kVA - 3300V - 50 Hz

V6.10 - 12/2023

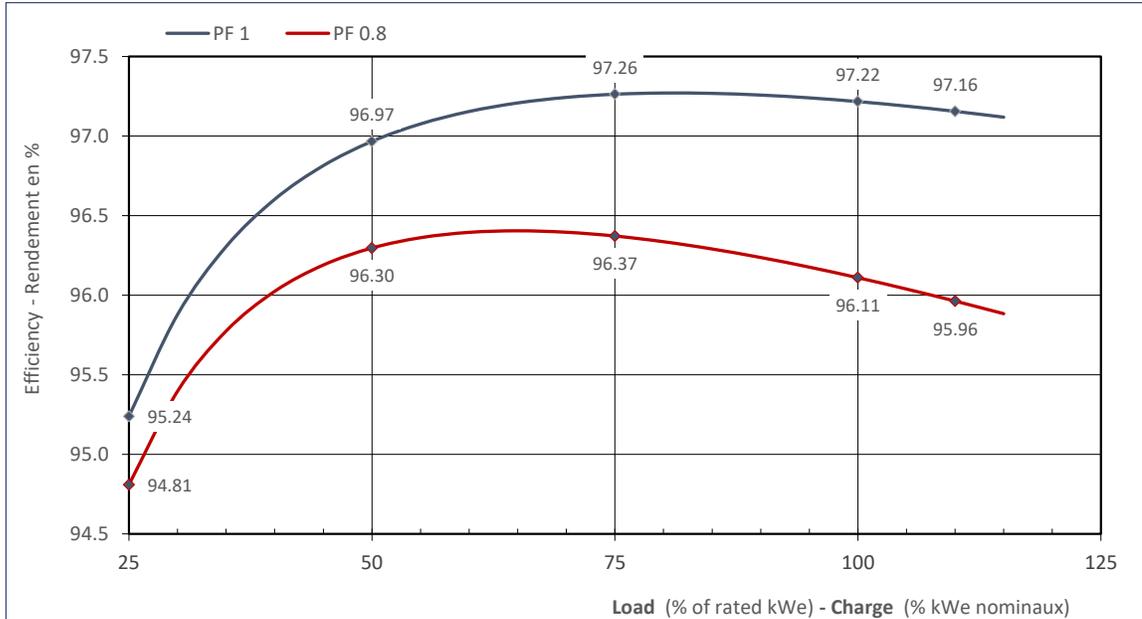
Capability Curve

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



Efficiency Curves

According to: IEC



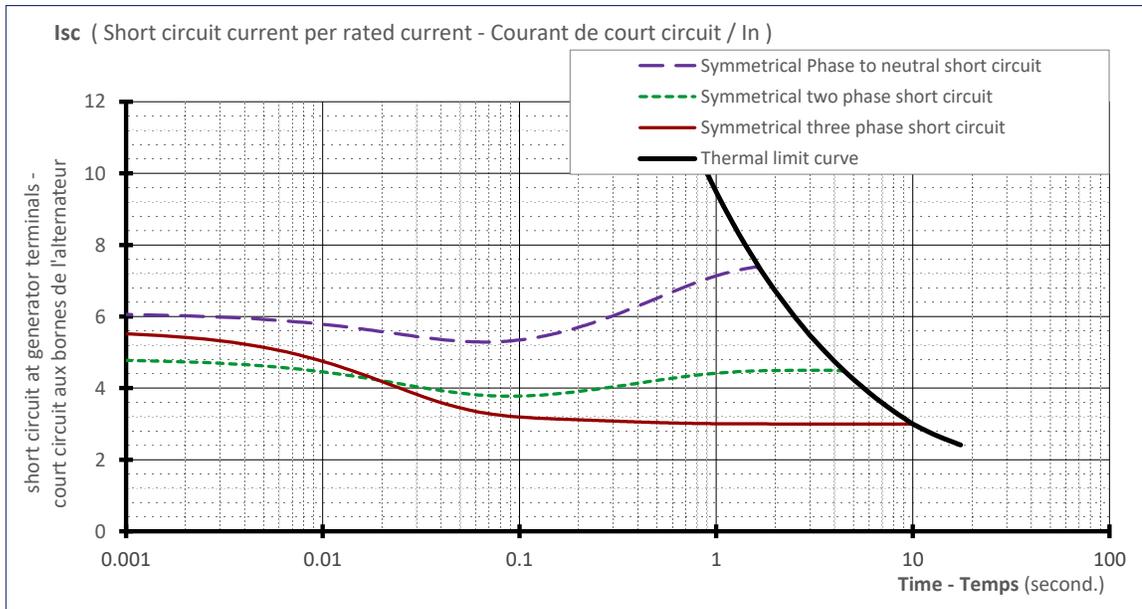
ALTERNATOR MAIN CURVES

LSA 53.2 M7 / 4P

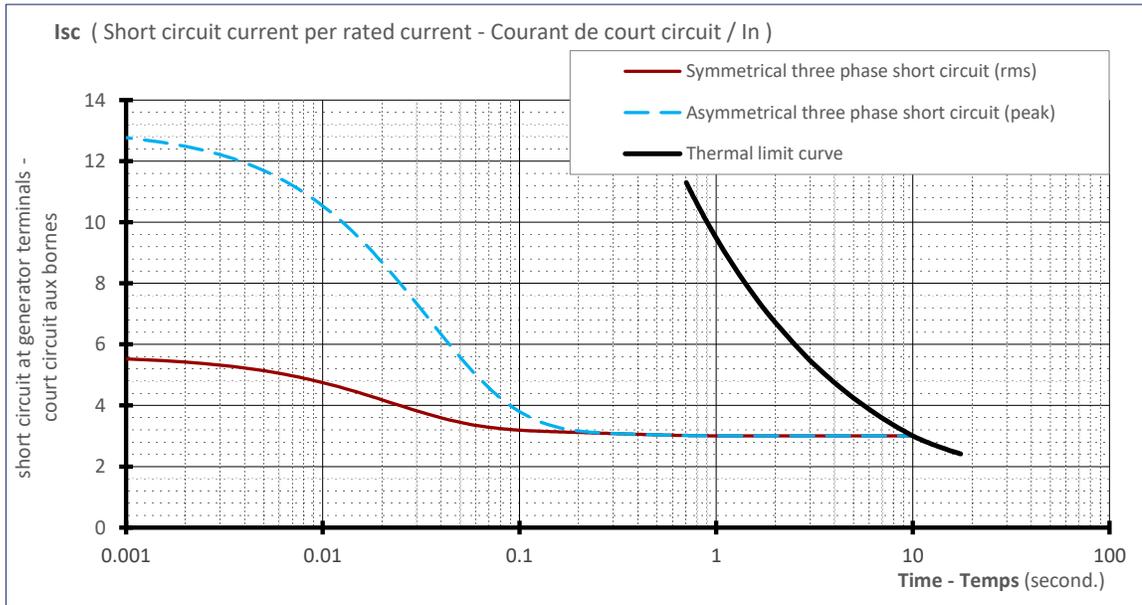
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Stator Current decrement curves

Symmetrical phase to neutral short-circuit		initial	2 222	A	6.1 x In	
Symmetrical two phase short-circuit		max	1 752	A	4.8 x In	In = 367 A
Symmetrical three phase short-circuit		value	2 027	A	5.5 x In	
Thermal Limit						



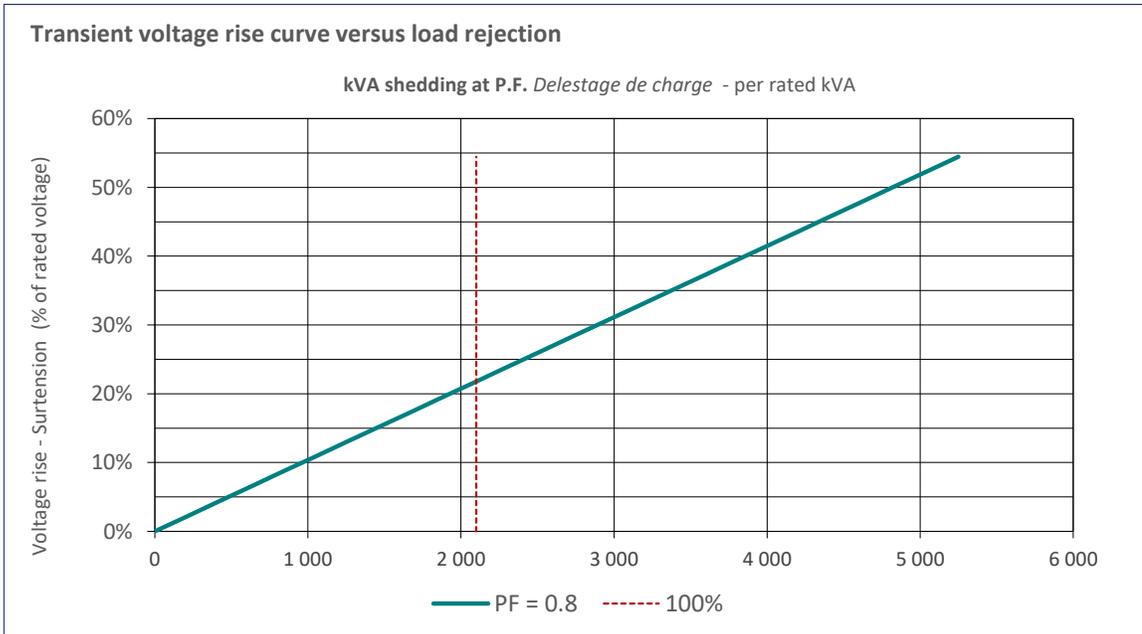
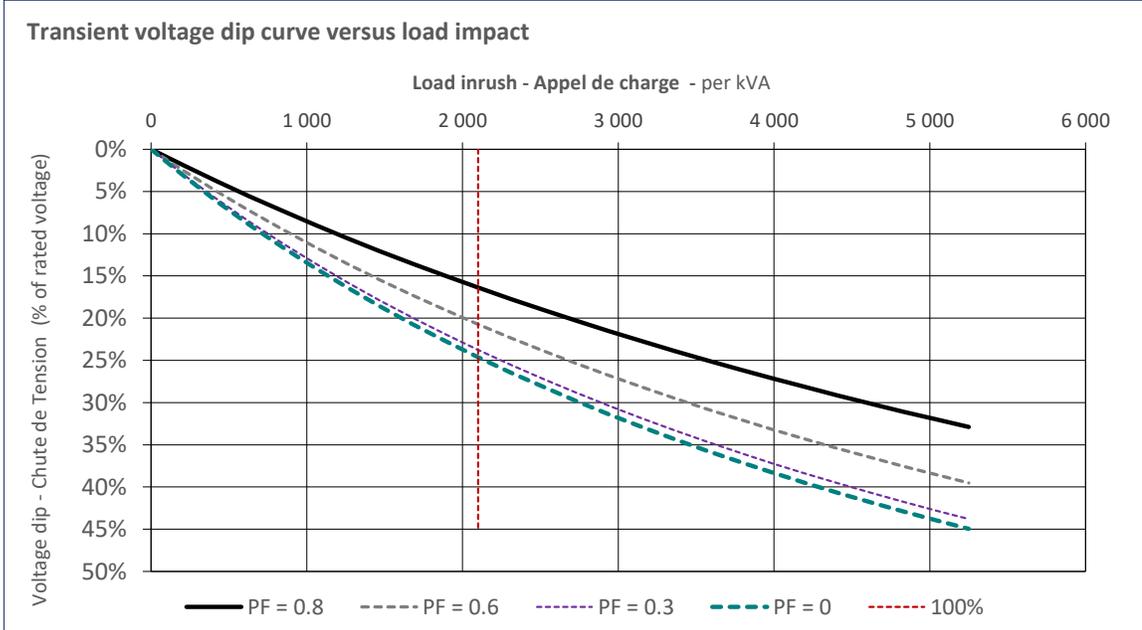
Asymmetrical three phase short-circuit IP 4 638 A 12.6 x In



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Transient Voltage Variation

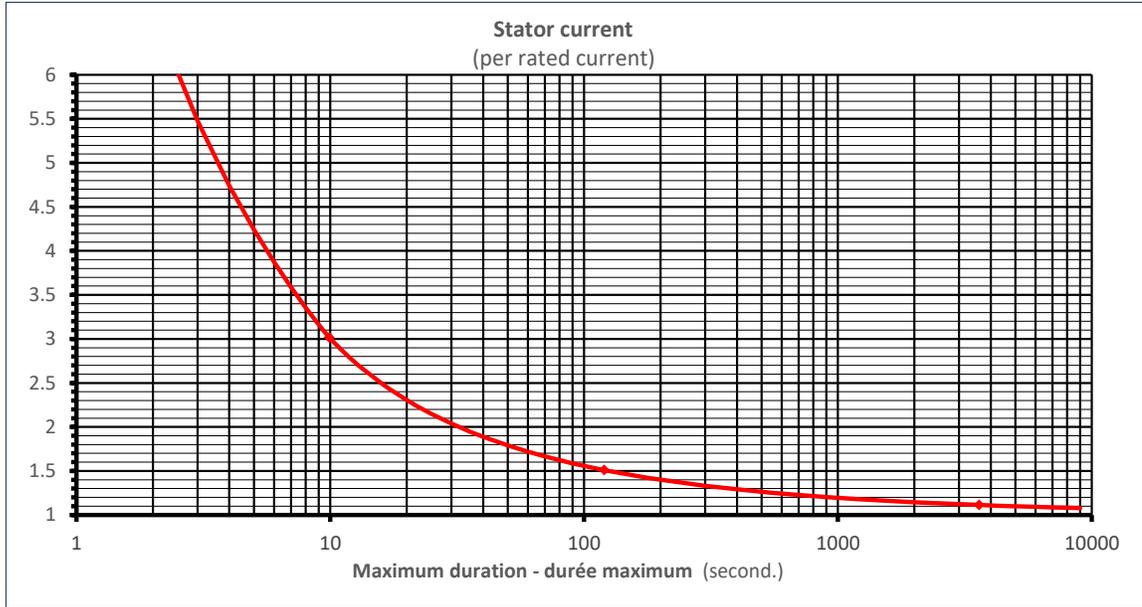


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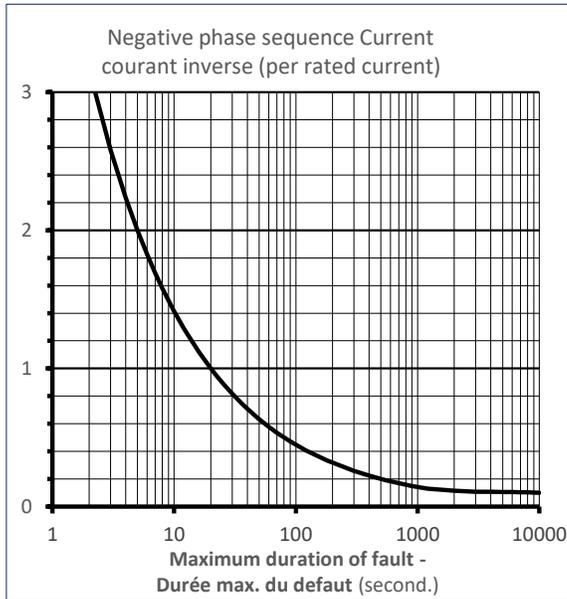
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Thermal Damage Curve



Unbalance Load Curve



Stator Earth Fault Current

