

ALTERNATOR TECHNICAL DESCRIPTION

LSA 53.2 ZL12 / 4p

LS Reference: TDS-MVH-1245

Date: 14-04-2025

V6.10d - 07/2024

Leroy-Somer
Electric Power Generation
Bangalore

Main data

Generator type:	LSA 53.2 ZL12 / 4p		
Power:	2 800 kVA	2 240 kWe	2 326 kWm
Voltage:	11 000 V	Star serial	
Rated voltage range:	+5/-5%		
Power factor - Lagging:	0.8		
Frequency:	50	Hz	
Speed:	1 500	RPM	
Nominal current:	147	A	
Winding type:	p5/6		
Classes (Insulation / Temperature Rise):	H / F		
Ambient temperature:	40	°C	
Altitude:	1 000	m	

Installation

Prime mover:	Reciprocating engine
Manufacturer:	-
Type:	-
Duty:	Base Rating

Mechanical construction

Type of construction:	Single bearing
Mounting arrangement:	Horizontal Axis
Direction of rotation:	Clockwise (when facing the drive end - DE)
Bearing type:	Anti-friction
Bearing Lubrication:	Regreasable
Bearing insulation:	Not insulated
Shaft end type:	Cylindrical with keyway
Balancing - Class:	G2,5 (std)
Flange:	SAE 00
Shaft height:	Refer dimension drawing
Width:	Refer dimension drawing

Additional specificities

Stabilized Runaway speed:	1 800 rpm - 2 min.
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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
Excitation:	Self-excited - Brushless: AREP + PMI
Sustained 3-phase Isc:	> 3 x FLC for 10s.
AVR type:	Leroy Somer - D550 - Digital
AVR location:	In terminal box
Alternator Voltage sensing:	Terminal box mounted voltage sensing VTs

Terminal box

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

Protection and measurement accessories

Temperature detection

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

Anti-condensation heating

Alternator:	Voltage: 230 V - 1Ph / Power: 2x250 W
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Various items

Paint:	Customer to confirm
Documentation:	PDF maintenance manual
Documentation Language:	English

ALTERNATOR ELECTRICAL DATA

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Main data:

Power:	2 800 kVA	2 240 kWe	2 326 kWm
Voltage:	11000 V	Frequency:	50 Hz
Rated voltage range:	+5% / -5%	Speed:	1500 rpm
Power factor - Lagging:	0.8	Phases	3
Nominal current:	147 A	Connexion	Star serial
Insulation / Temperature rise:	H / F	Winding type:	p5/6
Cooling:	IC01	Winding:	- 6 Wires
Ambient temperature:	40 °C	Overspeed (rpm)	1800
Altitude:	1000 m	Total Harmonic Distortion (THD)	< 1.5%
Duty: Base Rating			

Efficiency (Base 2240 kWe)

	25%	50%	75%	100%	110%
Power factor - Lagging: 0.8	93.93	96.02	96.37	96.31	96.23
Power factor - Lagging: 1	94.30	96.58	97.12	97.24	97.23

Reactances (%) - (Base 2800 kVA)

Unitary impedance (1 per unit) = 43.214286 ohms

		Unsaturated	Saturated		Unsaturated	Saturated
	Direct axis				Quadrature axis	
Synchronous reactance	Xd	266	238	Xq	136	121
Transient reactance	X'd	26.9	22.8	X'q	136	121
Subtransient reactance	X''d	14.4	12.2	X''q	15.1	12.9
Negative sequence reactance	X2	14.8	12.5			

X0	10.9	Zero sequence reactance
Xl	7.2	Stator leakage reactance
Xr	21.3	Rotor leakage reactance
Kc	0.42	Short-circuit ratio

Time constants (s)

	Direct axis	Quadrature axis
Open circuit transient time constant	T'do 3.12	T'qo NA
Short-circuit transient time constant	T'd 0.315	T'q NA
Open circuit subtransient time constant	T''do 0.035	T''qo 0.153
Subtransient time constant	T''d 0.019	T''q 0.017

Ta 0.036 Armature winding short circuit time constant

Resistances (%)

Ra	1.3	Armature resistance	R0	3.6	Zero sequence resistance
X/R	9.4	X/R ratio (without unit)	R2	3.0	Negative sequence resistance

Voltage accuracy:0.25%

Maximum inrush current for a voltage dip of 15%: 2043 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, improve the design or change conditions of utilization.

ALTERNATOR MAIN CURVES
LSA 53.2 ZL12 / 4P

LS Reference: TDS-MVH-1245

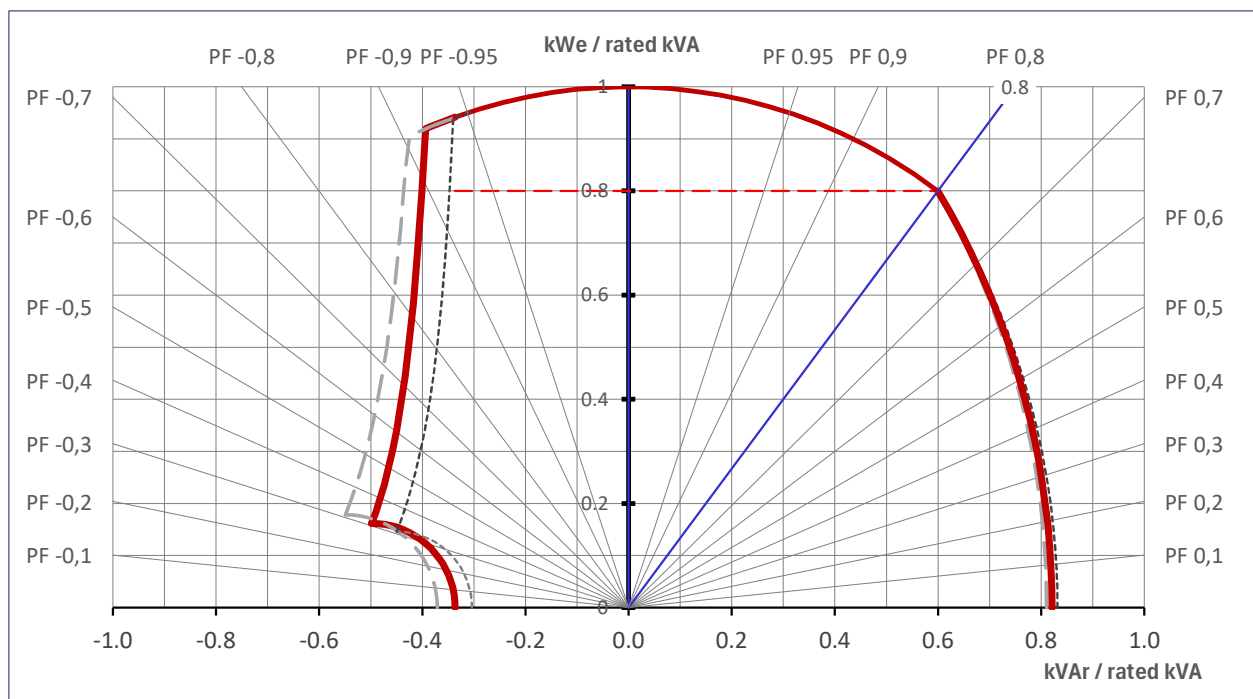
Date: 14-04-2025

2800kVA - 11000V - 50 Hz

V6.10d - 07/2024

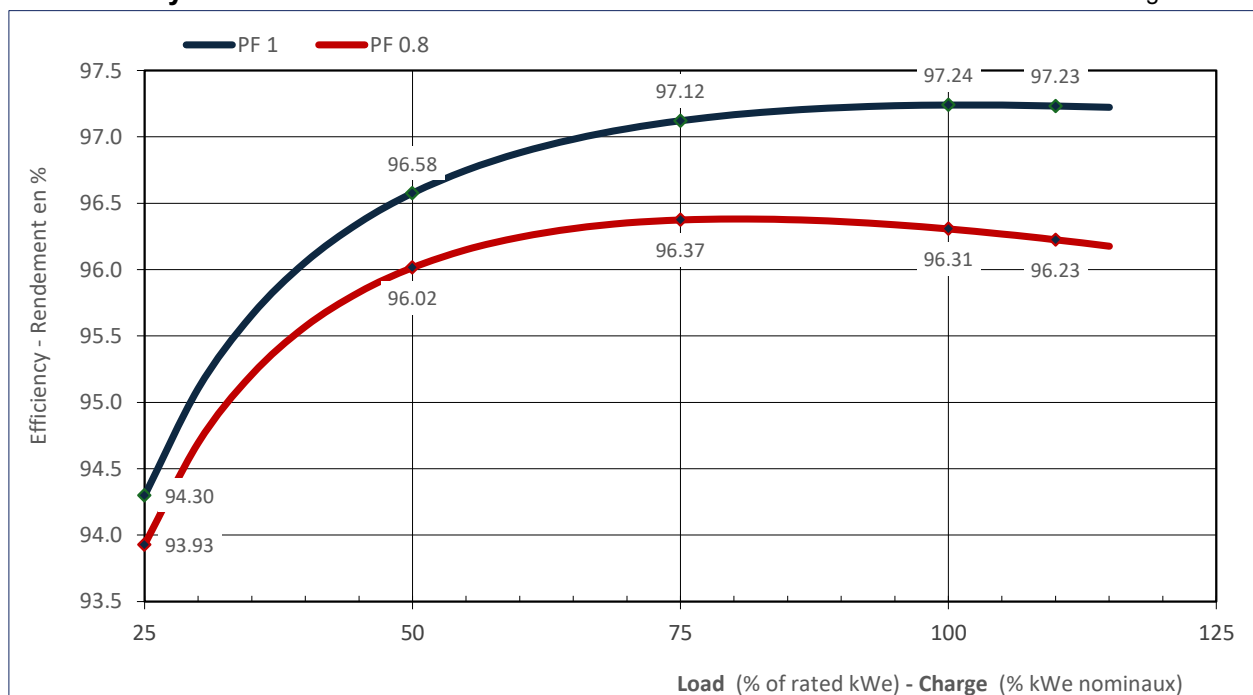
Capability Curve

---	Umax	+ 5%	11 550	V
—	Un		11 000	V
---	Umin	- 5%	10 450	V



Efficiency Curves

According to: IEC

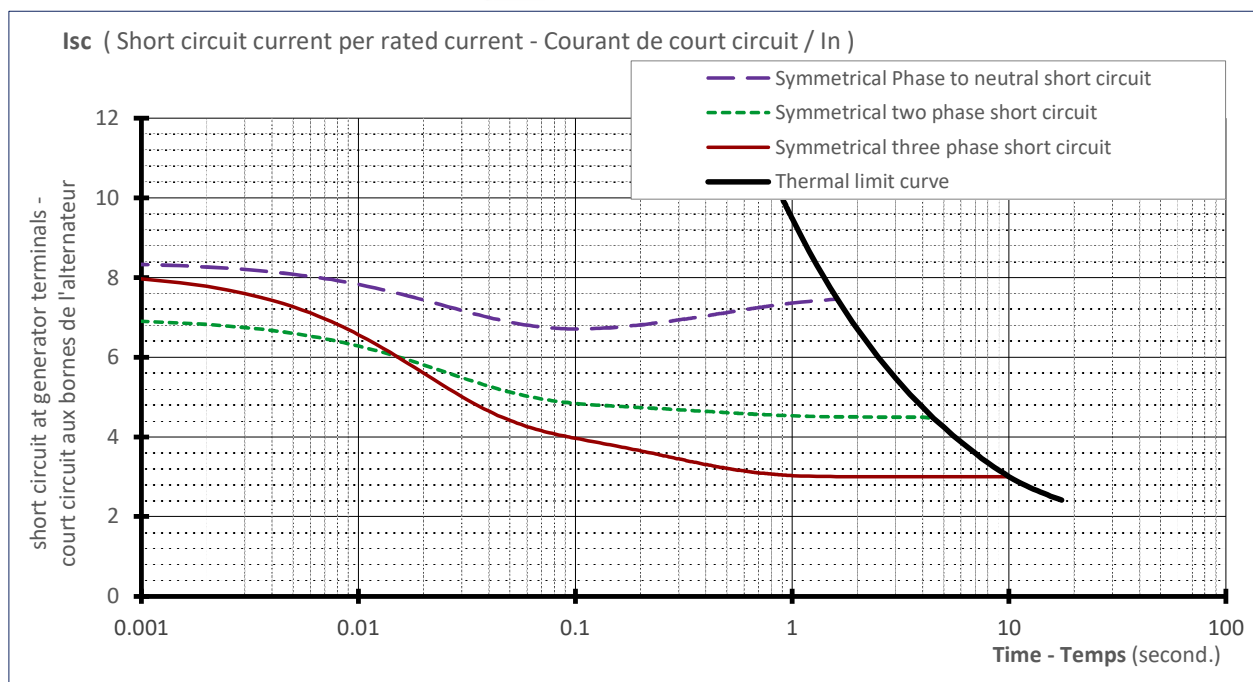


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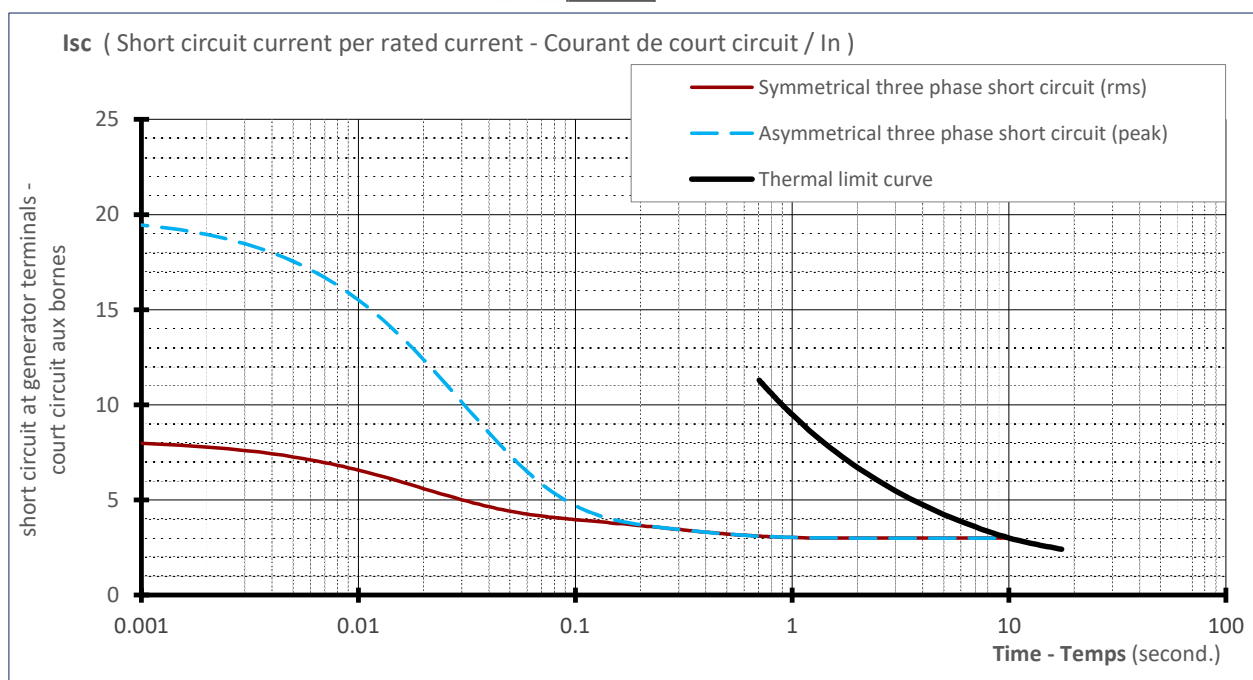
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Stator Current decrement curves

Symmetrical phase to neutral short-circ	initial	1 225	A	8.3 x In	
Symmetrical two phase short-circuit	max	1 015	A	6.9 x In	In = 147 A
Symmetrical three phase short-circuit	value	1 172	A	8 x In	
Thermal Limit					



Asymmetrical three phase short-circuit IP 2 833 A 19.3 x In

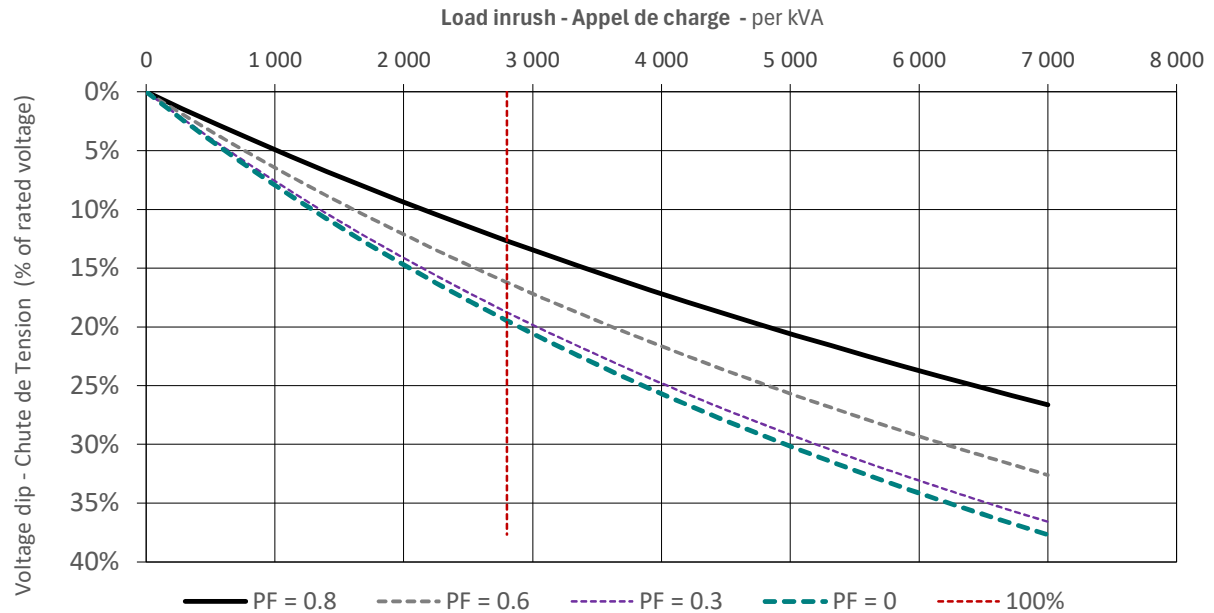


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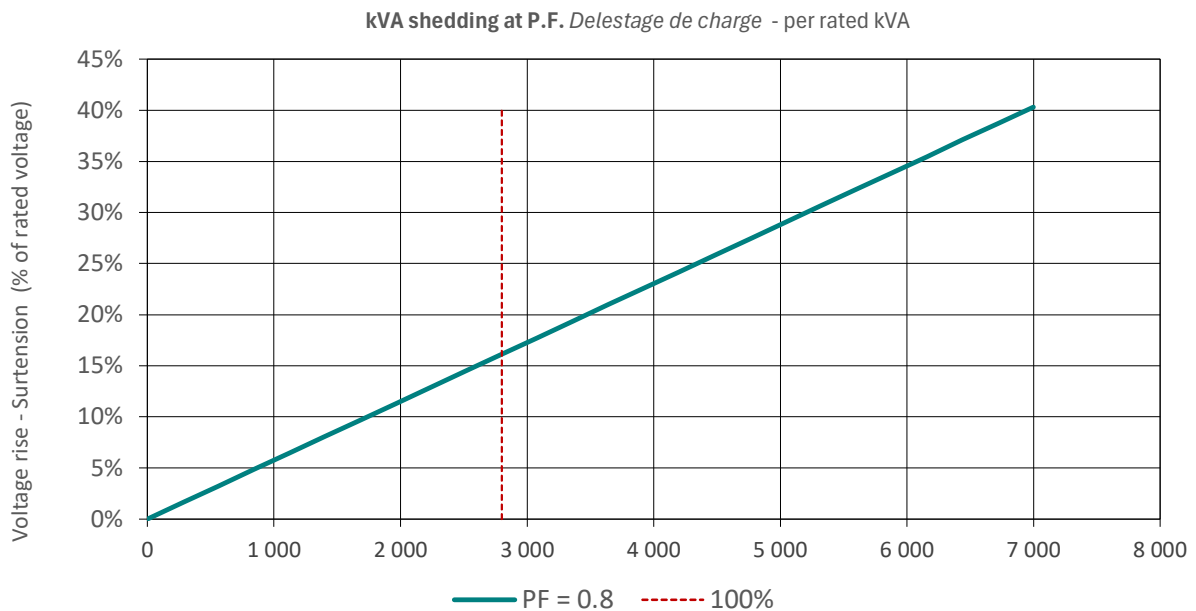
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Transient Voltage Variation

Transient voltage dip curve versus load impact



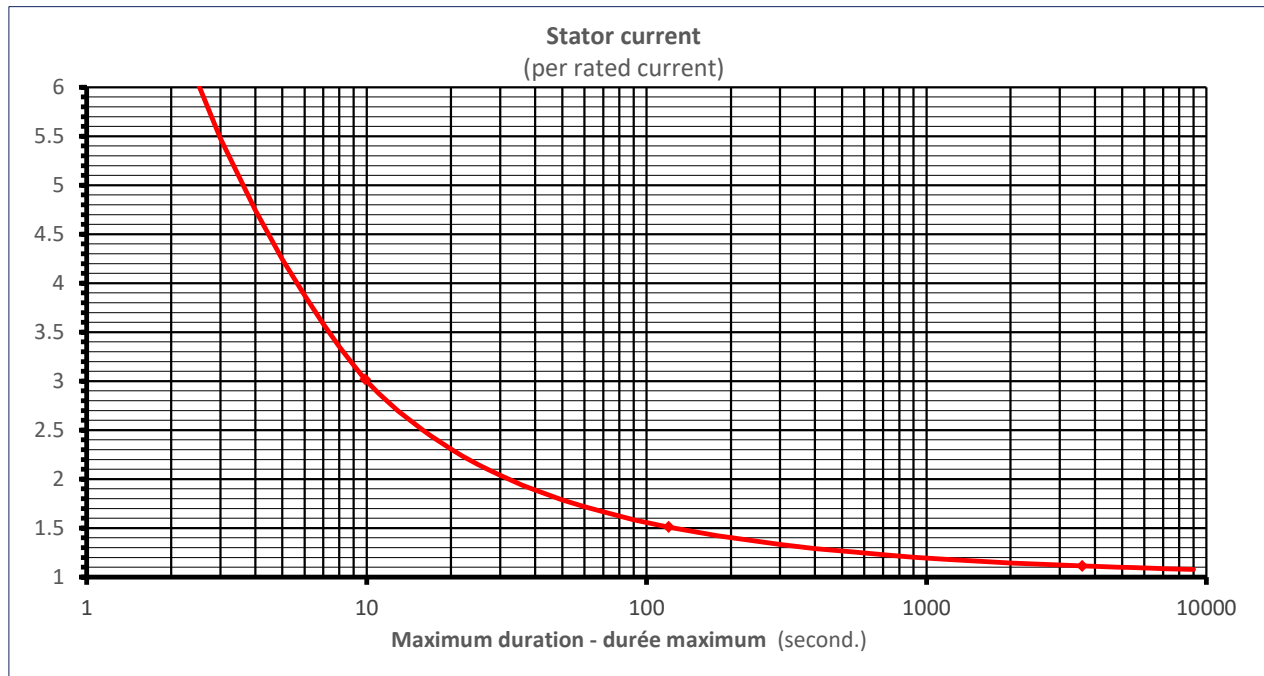
Transient voltage rise curve versus load rejection



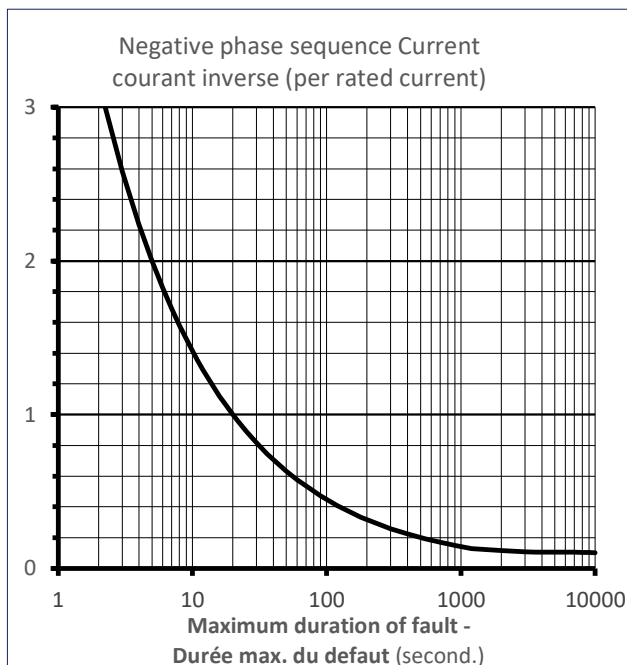
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Thermal Damage Curve



Unbalance Load Curve



Stator Earth Fault Current

