

ALTERNATOR TECHNICAL DESCRIPTION
LSA 52.3 ZL11 / 4p

LS Reference: **OF241039_3.3KV_2180KVA** 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
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Main data C 1

Generator type: **LSA 52.3 ZL11 / 4p** 1
Power: 2 180 kVA 1 744 kWe 1 812 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: 381 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

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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Main data:

Power:	2 180 kVA	1 744 kW _e	1 812 kW _m	1
Voltage:	3300 V	Frequency:	50 Hz	1
Rated voltage range:	+5% / -5%	Speed:	1500 rpm	1
Power factor - Lagging:	0.8	Phases	3	1
Nominal current:	381 A	Connexion	Star serial	1
Insulation / Temperature rise:	H / F	Winding type:	p5/6	1
Cooling:	IC01	Winding:	- 6 Wires	1
Ambient temperature:	40 °C	Overspeed (rpm)	1800	1
Altitude:	1000 m	Total Harmonic Distortion (THD)	< 1.5%	1
Duty: Base Rating				

Efficiency (Base 1744 kW_e)

	25%	50%	75%	100%	110%
Power factor - Lagging: 0.8	92.91	95.53	96.14	96.23	96.20
Power factor - Lagging: 1	93.44	96.21	96.96	97.20	97.23

Reactances (%) - (Base 2180 kVA)

Unitary impedance (1 per unit) = 4.995413 ohms

		Unsaturated	Saturated	Unsaturated	Saturated
	Direct axis			Quadrature axis	
Synchronous reactance	X _d	194	167	X _q	85
Transient reactance	X' _d	21.8	18.5	X' _q	85
Subtransient reactance	X'' _d	10.6	9.0	X'' _q	9.4
Negative sequence reactance	X ₂	10.8	9.2		
X ₀	6.7	Zero sequence reactance			
X _l	5.3	Stator leakage reactance			
X _r	18.0	Rotor leakage reactance			
K_c	0.60	Short-circuit ratio			

Time constants (s)

	Direct axis	Quadrature axis
Open circuit transient time constant	T' _{do} 1.72	T' _{qo} NA
Short-circuit transient time constant	T' _d 0.193	T' _q NA
Open circuit subtransient time constant	T'' _{do} 0.025	T'' _{qo} 0.097
Subtransient time constant	T'' _d 0.012	T'' _q 0.011
T _a	0.031	Armature winding short circuit time constant

Resistances (%)

R _a	1.1	Armature resistance	R ₀	2.2	Zero sequence resistance
X/R	8.1	X/R ratio (without unit)	R ₂	2.2	Negative sequence resistance

Voltage accuracy: 0.25%

Maximum inrush current for a voltage dip of 15%: 1963 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 52.3 ZL11 / 4P

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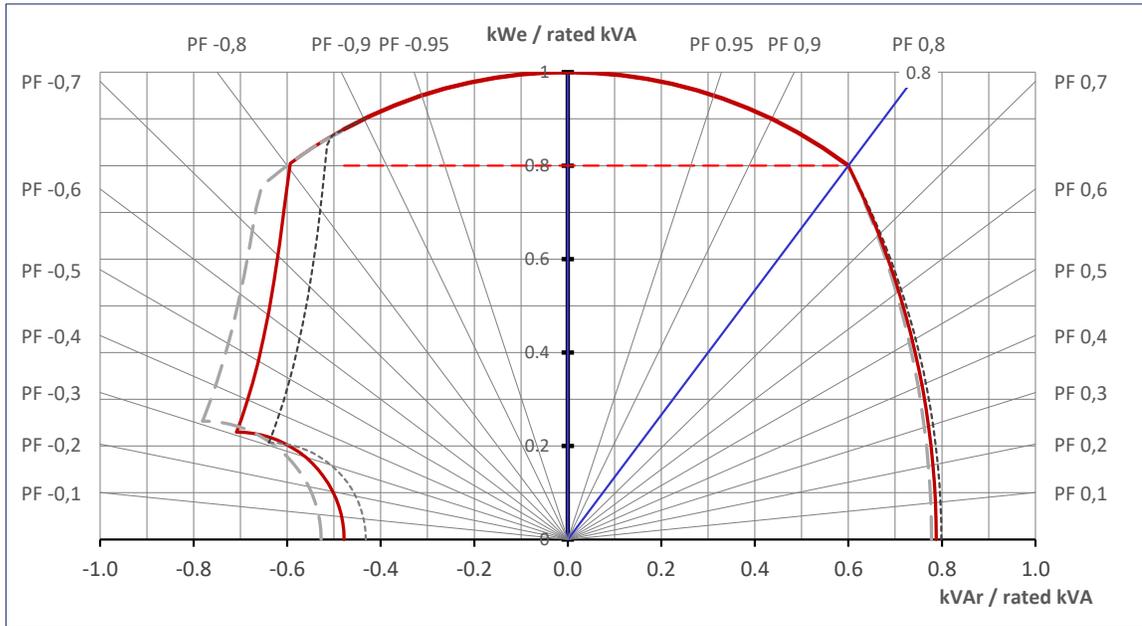
Date: 10-28-2024

2180kVA - 3300V - 50 Hz

V6.10 - 12/2023

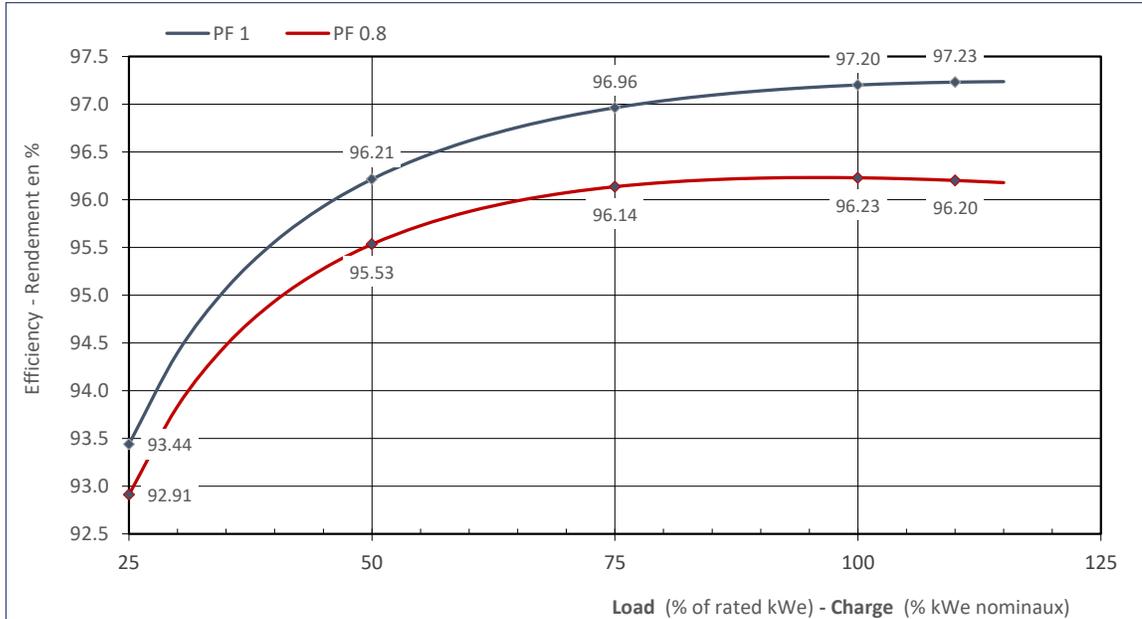
Capability Curve

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



Efficiency Curves

According to: IEC

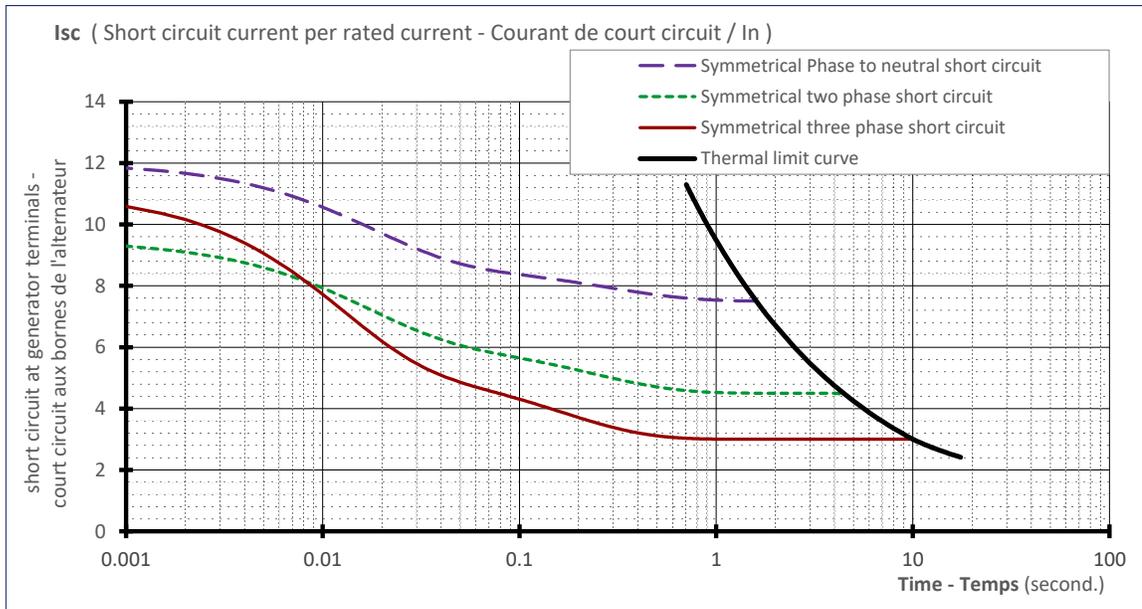


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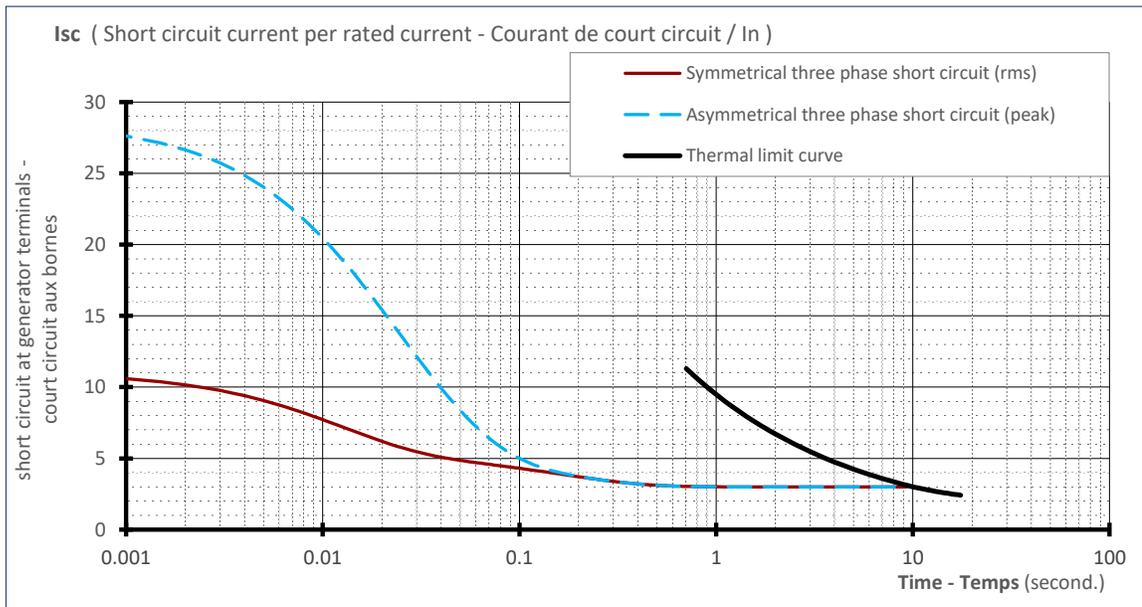
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Stator Current decrement curves

Symmetrical phase to neutral short-circuit	—	initial	4 512	A	11.8 x In	
Symmetrical two phase short-circuit	- - -	max	3 540	A	9.3 x In	In = 381 A
Symmetrical three phase short-circuit	—	value	4 035	A	10.6 x In	
Thermal Limit	—					



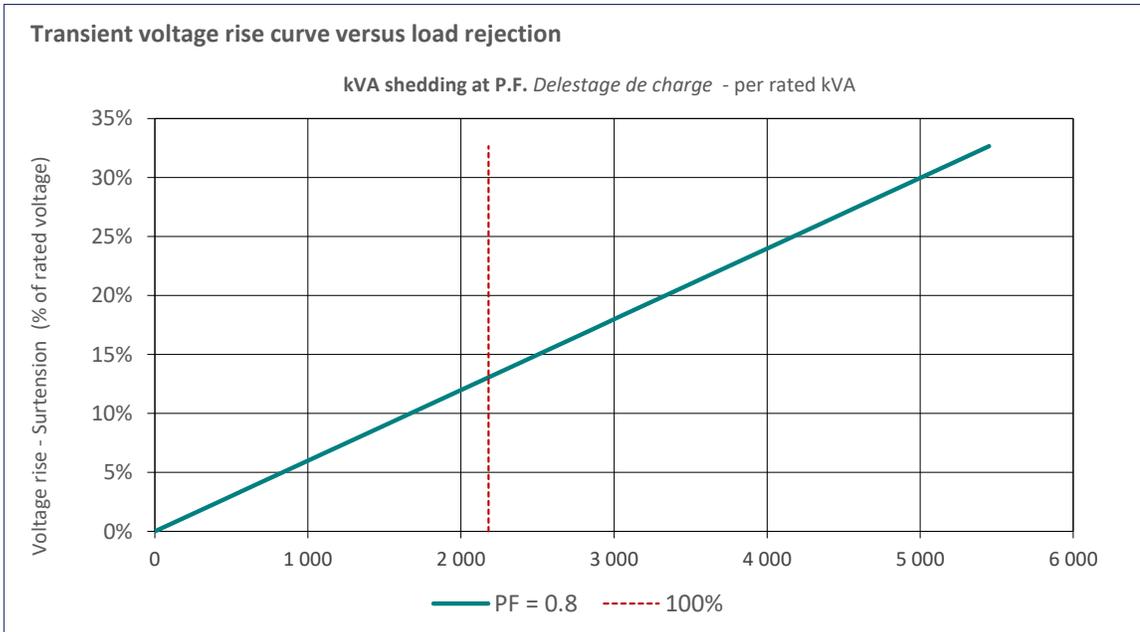
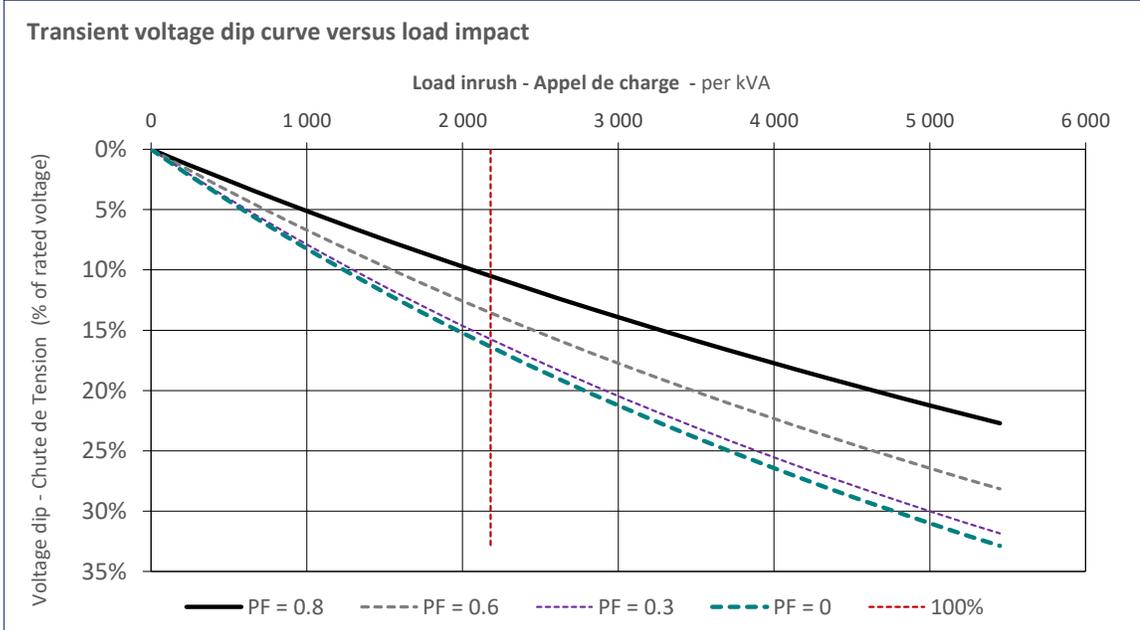
Asymmetrical three phase short-circuit — IP 10 446 A 27.4 x In



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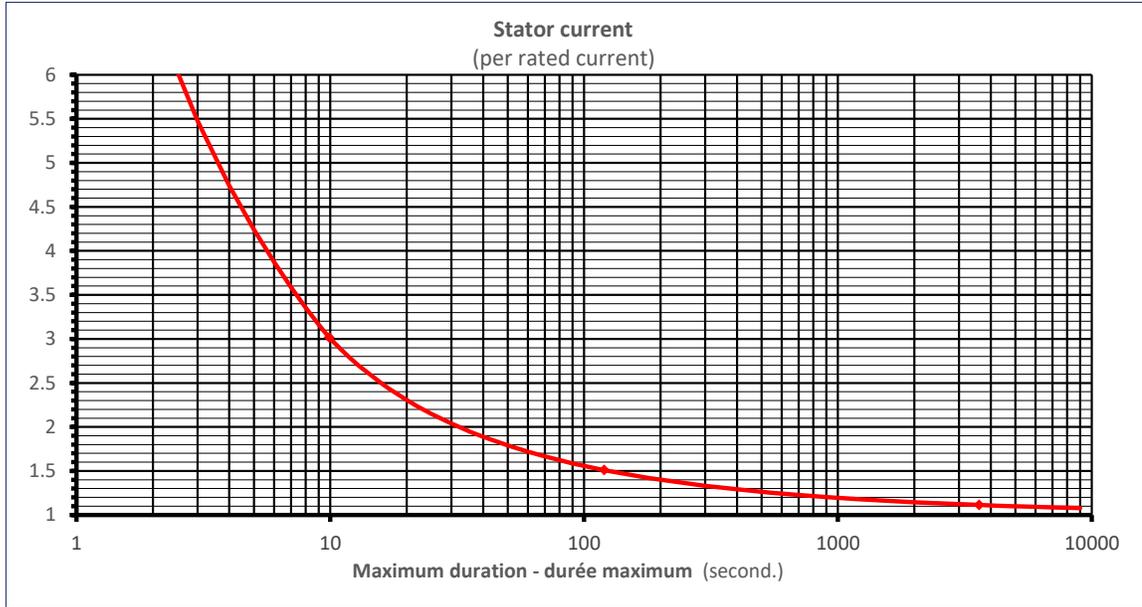
Transient Voltage Variation



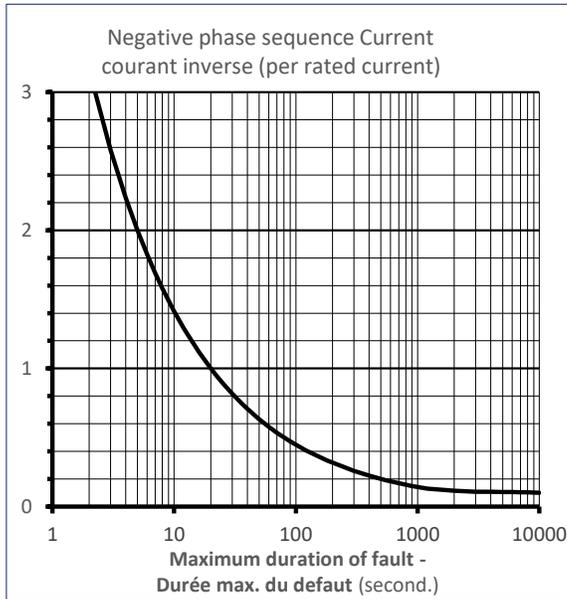
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Thermal Damage Curve



Unbalance Load Curve



Stator Earth Fault Current

