

ALTERNATOR TECHNICAL DESCRIPTION

LSA 52.3 ZL11 / 4p

LS Reference: OF241039_2050KVA 6.6KV 1

Date: 10-28-2024 V6.10 - 12/2023 1
Project Manager : Aviva 1
Leroy-Somer Paul.HU@mail.nidec.com
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 52.3 ZL11 / 4p 1
Power: 2 050 kVA 1 640 kW_e 1 708 kW_m 1
Voltage: 6 600 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: 179 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 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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V6.10 - 12/2023

Main data:						C	
Power:	2 050	kVA	1 640	kWe	1 708	kWm	1
Voltage:	6600	V	Frequency:	50	Hz		1
Rated voltage range:	+5% / -5%		Speed:	1500	rpm		1
Power factor - Lagging:	0.8						1
Nominal current:	179	A	Phases	3			
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 1640 kWe)						IEC
	25%	50%	75%	100%	110%	
Power factor - Lagging: 0.8	93.18	95.56	96.01	95.99	95.93	1
Power factor - Lagging: 1	93.69	96.26	96.90	97.06	97.06	1

Reactances (%) - (Base 2050 kVA)						
Unitary impedance (1 per unit) = 21.24878 ohms						
		Unsaturated		Saturated		
	Direct axis			Quadrature axis		
Synchronous reactance	Xd	183	158	Xq	93	80
Transient reactance	X'd	20.5	17.4	X'q	93	80
Subtransient reactance	X''d	10.0	8.5	X''q	10.4	8.8
Negative sequence reactance	X2	10.2	8.7			
X0	6.3	Zero sequence reactance				1
Xl	5.0	Stator leakage reactance				
Xr	16.9	Rotor leakage reactance				
Kc	0.63	Short-circuit ratio				1

Time constants (s)						
		Direct axis		Quadrature axis		
Open circuit transient time constant	T'do	1.72		T'qo	NA	1
Short-circuit transient time constant	T'd	0.193		T'q	NA	1
Open circuit subtransient time constant	T''do	0.025		T''qo	0.097	1
Subtransient time constant	T''d	0.012		T''q	0.011	1
Ta	0.026	Armature winding short circuit time constant				1

Resistances (%)						
Ra	1.2	Armature resistance	R0	2.1	Zero sequence resistance	1
X/R	6.8	X/R ratio (without unit)	R2	2.0	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

LS Reference: OF241039_2050KVA 6.6KV

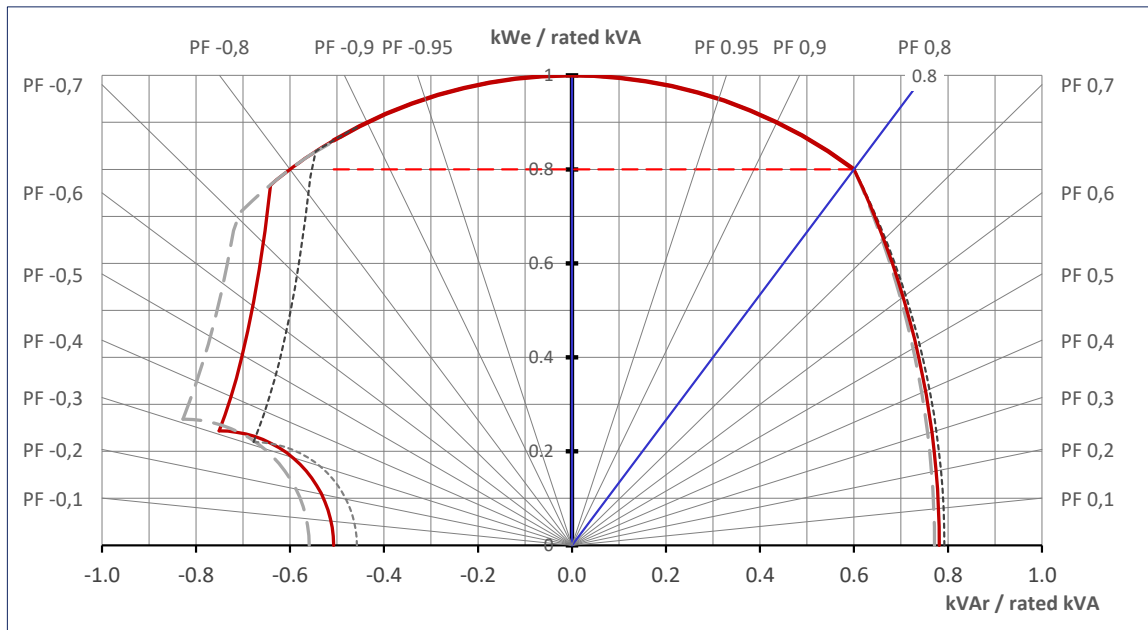
Date: 10-28-2024

2050kVA - 6600V - 50 Hz

V6.10 - 12/2023

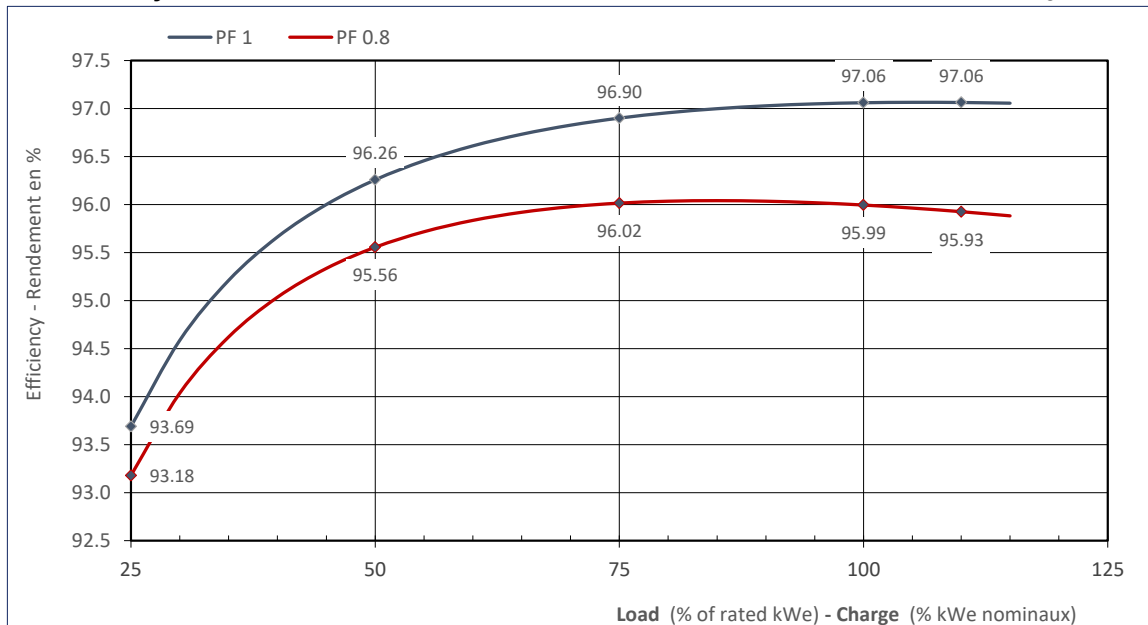
Capability Curve

---	Umax	+ 5%	6 930	V
---	Un		6 600	V
---	Umin	- 5%	6 270	V



Efficiency Curves

According to: IEC



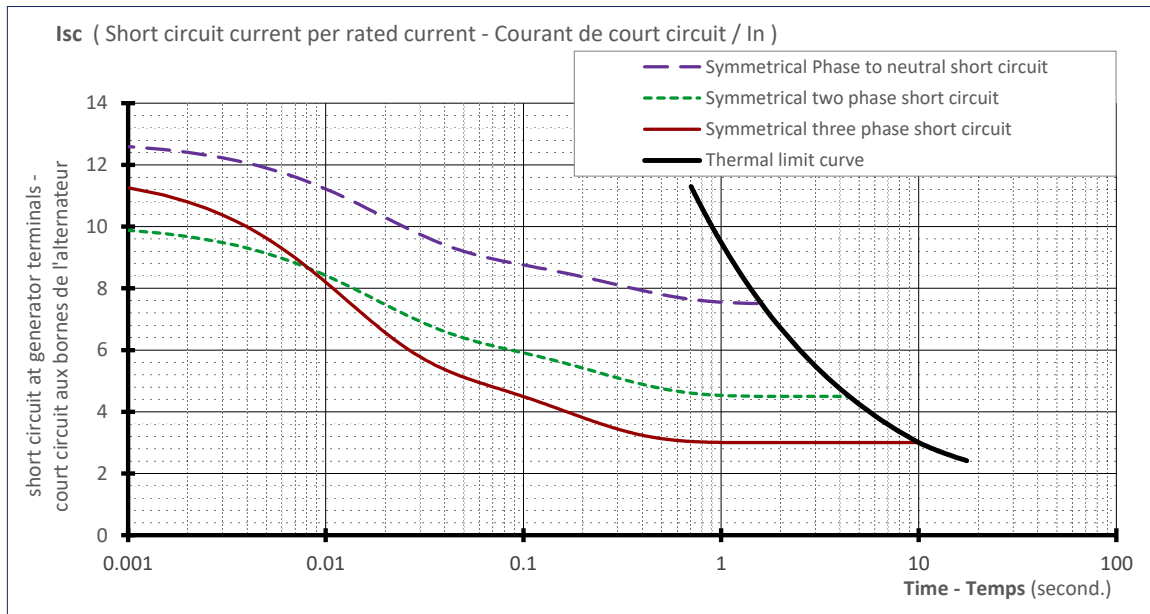
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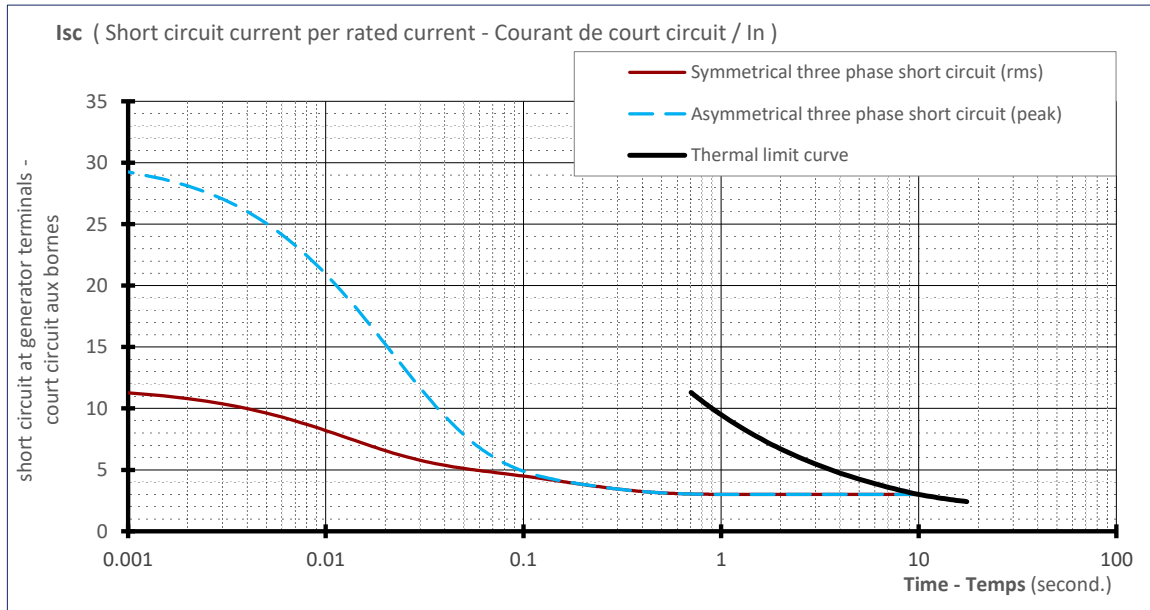
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Stator Current decrement curves

Symmetrical phase to neutral short-circuit	—	initial	2 254	A	12.6 x In	
Symmetrical two phase short-circuit	- - -	max	1 769	A	9.9 x In	In = 179 A
Symmetrical three phase short-circuit	—	value	2 016	A	11.3 x In	
Thermal Limit	—					



Asymmetrical three phase short-circuit — IP 5 207 A 29.1 x In

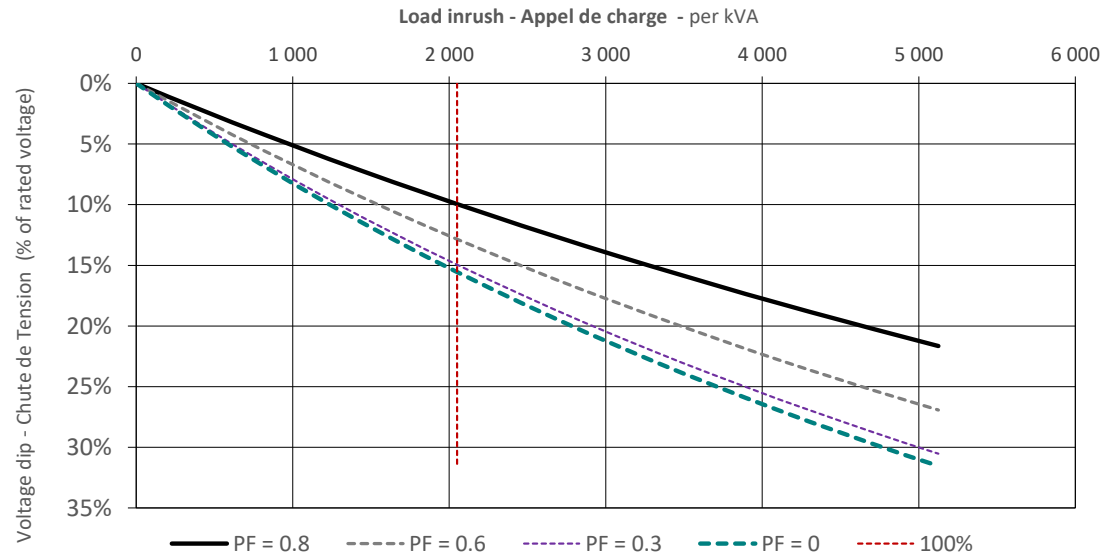


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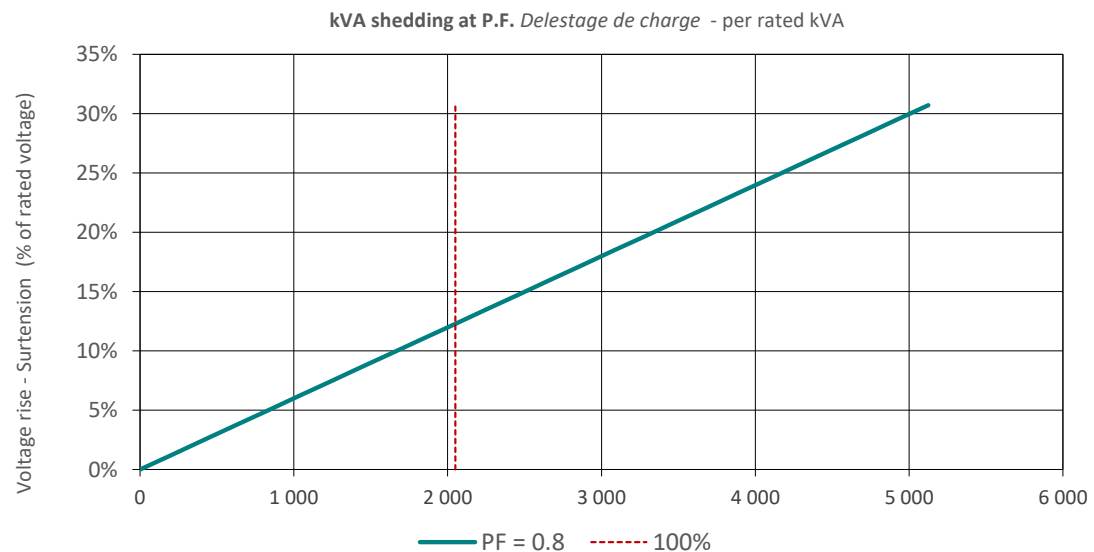
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Transient Voltage Variation

Transient voltage dip curve versus load impact



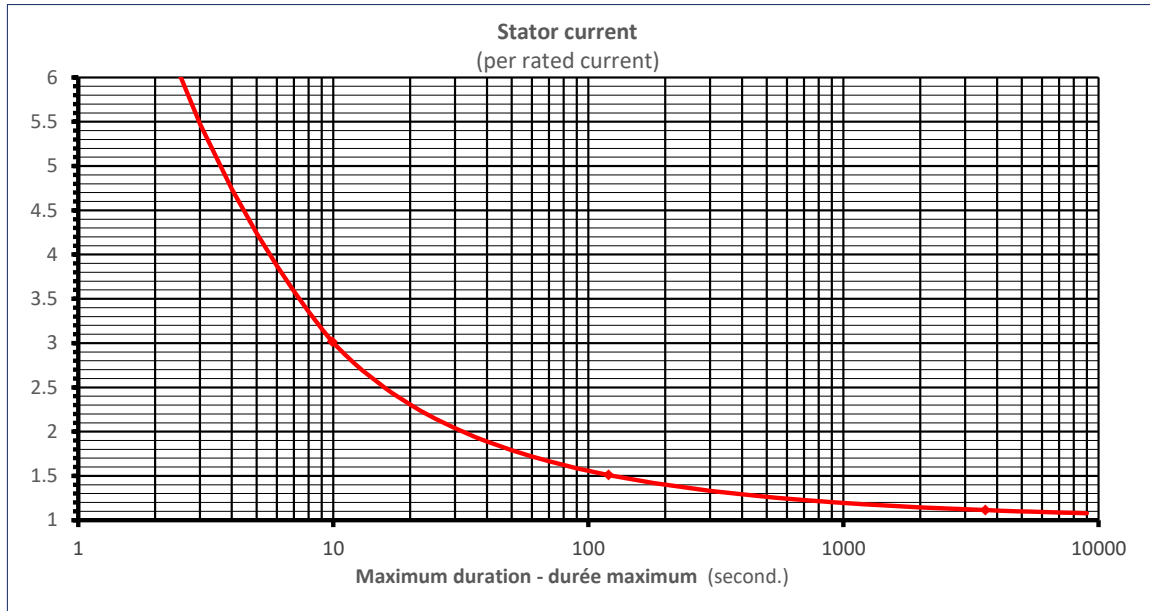
Transient voltage rise curve versus load rejection



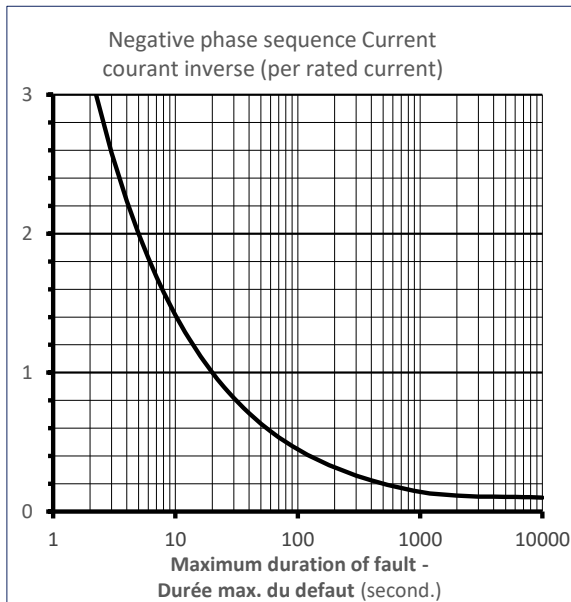
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Thermal Damage Curve



Unbalance Load Curve



Stator Earth Fault Current

