

ALTERNATOR TECHNICAL DESCRIPTION

LSA 52.3 AL10 / 4p

LS Reference: OF241039_1760KVA 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 AL10 / 4p 1

Power: 1 760 kVA 1 408 kW_e 1 469 kW_m 1

Voltage: 11 000 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: 92 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 - RAL 7032	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:

C

Power:	1 760 kVA	1 408 kW _e	1 469 kW _m	1
Voltage:	11000 V	Frequency:	50 Hz	1
Rated voltage range:	+5% / -5%	Speed:	1500 rpm	1
Power factor - Lagging:	0.8			1
Nominal current:	92 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 1408 kW_e)

IEC

	25%	50%	75%	100%	110%	
Power factor - Lagging: 0.8	92.91	95.37	95.86	95.84	95.76	1
Power factor - Lagging: 1	93.43	96.10	96.77	96.94	96.94	1

Reactances (%) - (Base 1760 kVA)

Unitary impedance (1 per unit) = 68.75 ohms

		Unsaturated	Saturated		Unsaturated	Saturated	
	Direct axis			Quadrature axis			
Synchronous reactance	X _d	199	180	X _q	102	92	1
Transient reactance	X' _d	23.2	19.7	X' _q	102	92	1
Subtransient reactance	X'' _d	11.8	10.1	X'' _q	12.2	10.4	1
Negative sequence reactance	X ₂	12.0	10.2				
X ₀	7.0	Zero sequence reactance					1
X _l	5.9	Stator leakage reactance					
X _r	19.0	Rotor leakage reactance					
Kc	0.56	Short-circuit ratio					1

Time constants (s)

		Direct axis		Quadrature axis		
Open circuit transient time constant	T' _{do}	1.61		T' _{qo}	NA	1
Short-circuit transient time constant	T' _d	0.187		T' _q	NA	1
Open circuit subtransient time constant	T'' _{do}	0.024		T'' _{qo}	0.090	1
Subtransient time constant	T'' _d	0.012		T'' _q	0.011	1
T _a	0.030	Armature winding short circuit time constant				1

Resistances (%)

R _a	1.3	Armature resistance	R ₀	2.3	Zero sequence resistance	1
X/R	7.9	X/R ratio (without unit)	R ₂	2.4	Negative sequence resistance	

Voltage accuracy: 0.25%

Maximum inrush current for a voltage dip of 15%: 1489 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 AL10 / 4P

LS Reference: OF241039_1760KVA

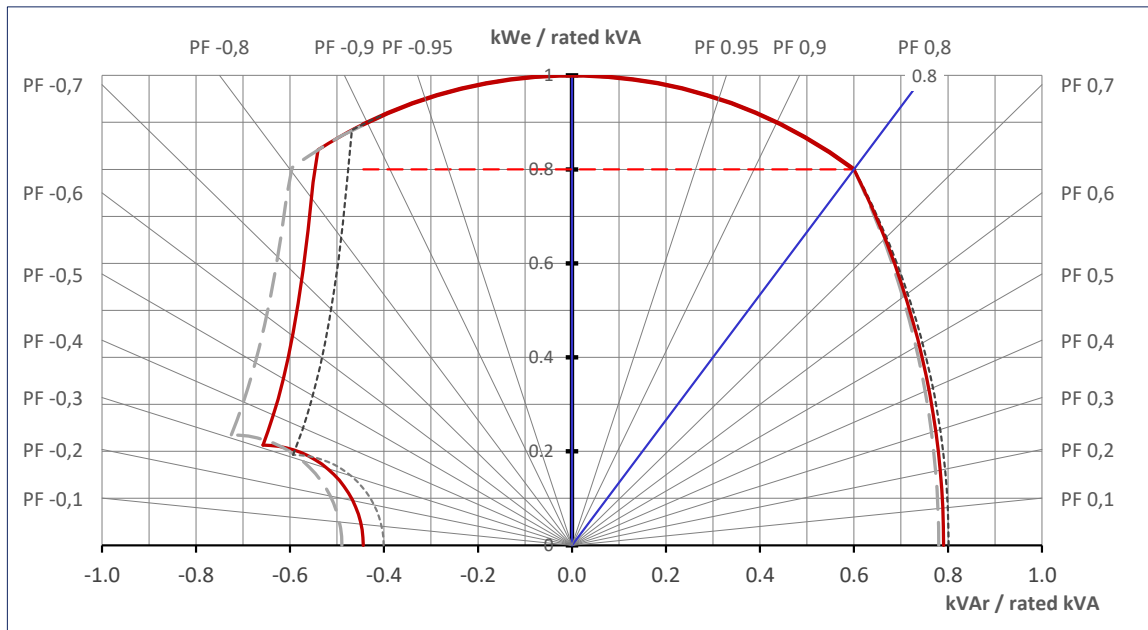
Date: 10-28-2024

1760kVA - 11000V - 50 Hz

V6.10 - 12/2023

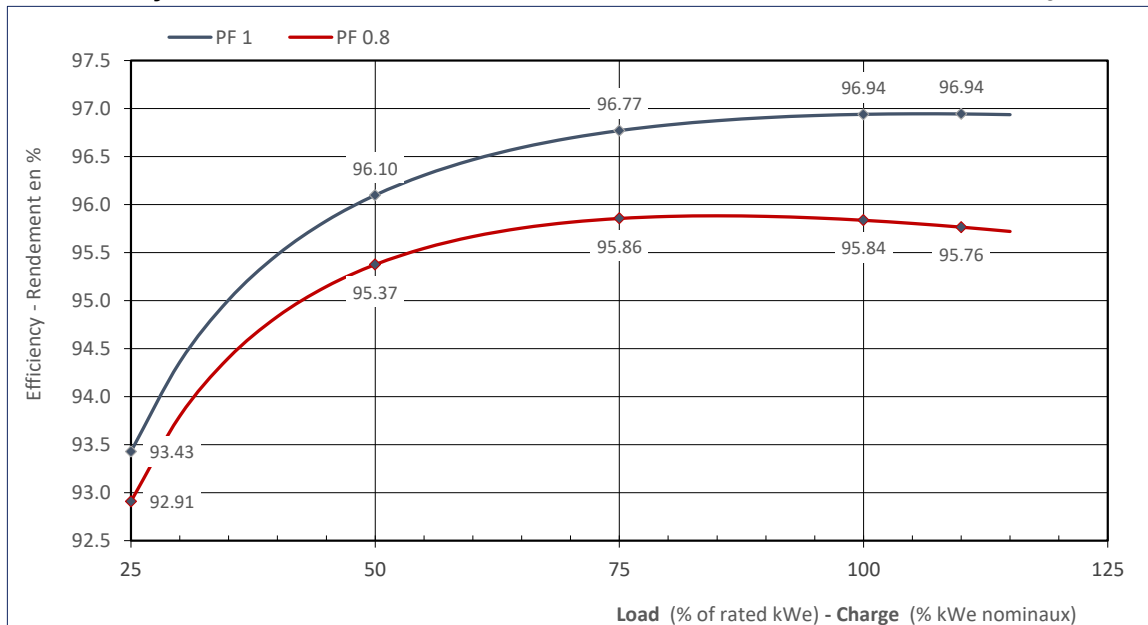
Capability Curve

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



Efficiency Curves

According to: IEC

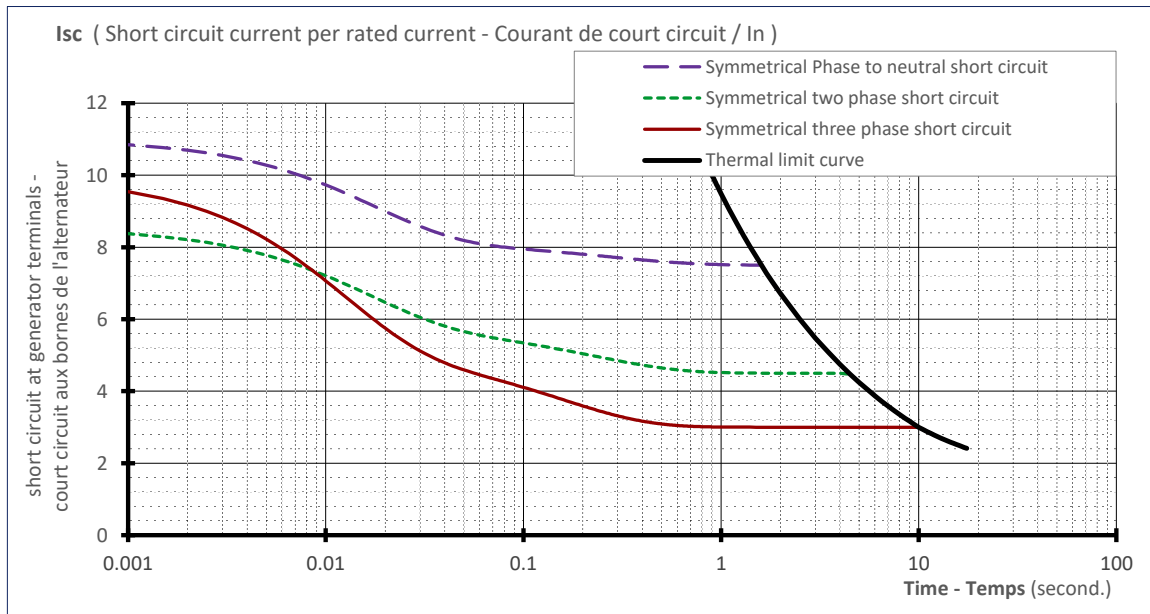


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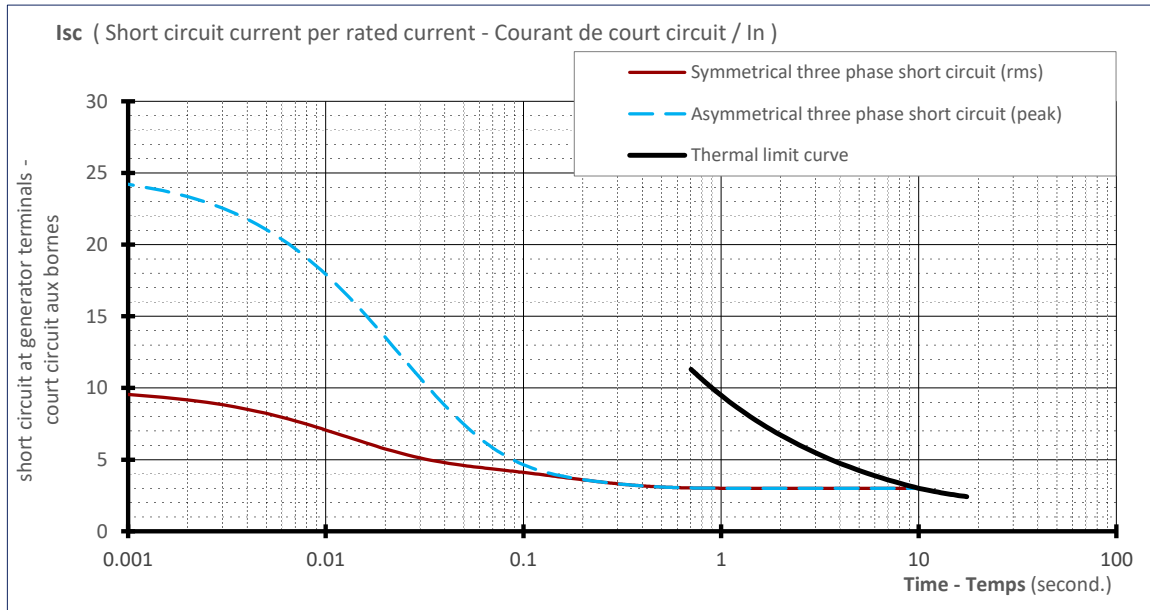
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Stator Current decrement curves

Symmetrical phase to neutral short-circuit	—	initial	998	A	10.8 x In	
Symmetrical two phase short-circuit	- - -	max	770	A	8.4 x In	In = 92 A
Symmetrical three phase short-circuit	—	value	878	A	9.5 x In	
Thermal Limit	—					



Asymmetrical three phase short-circuit — IP 2 210 A 24 x In

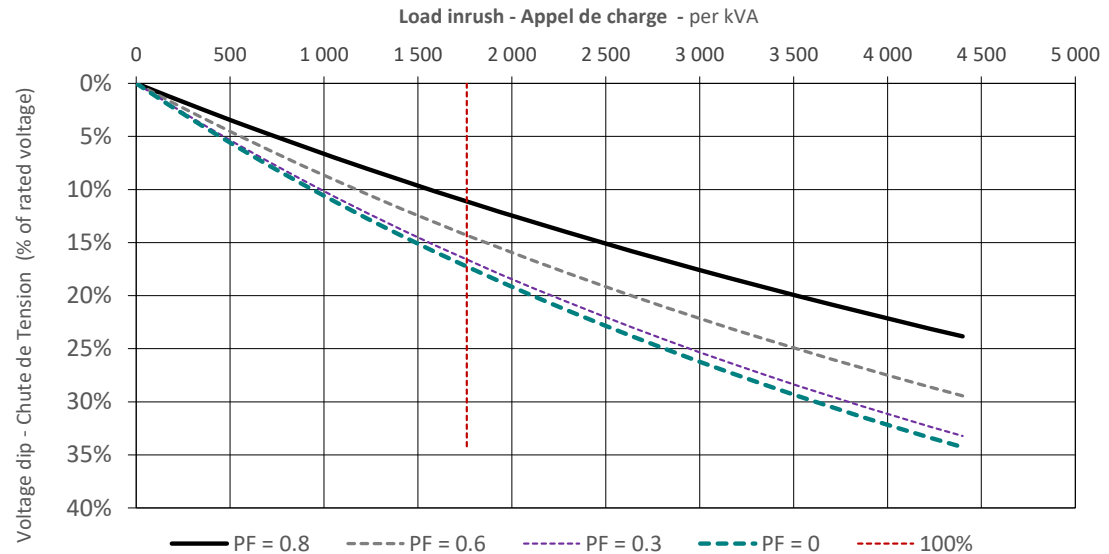


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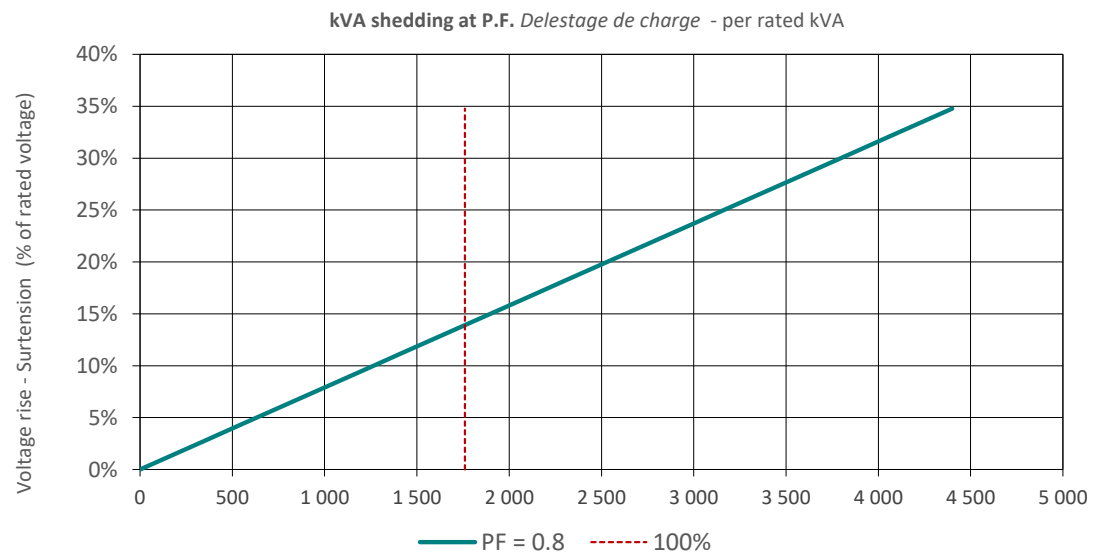
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Transient Voltage Variation

Transient voltage dip curve versus load impact



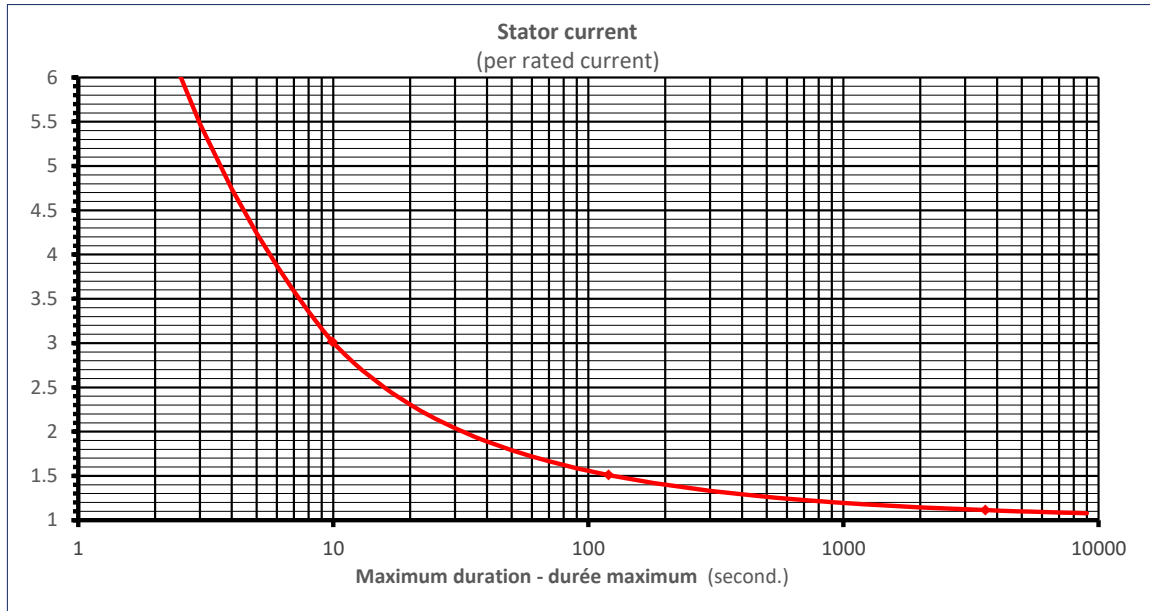
Transient voltage rise curve versus load rejection



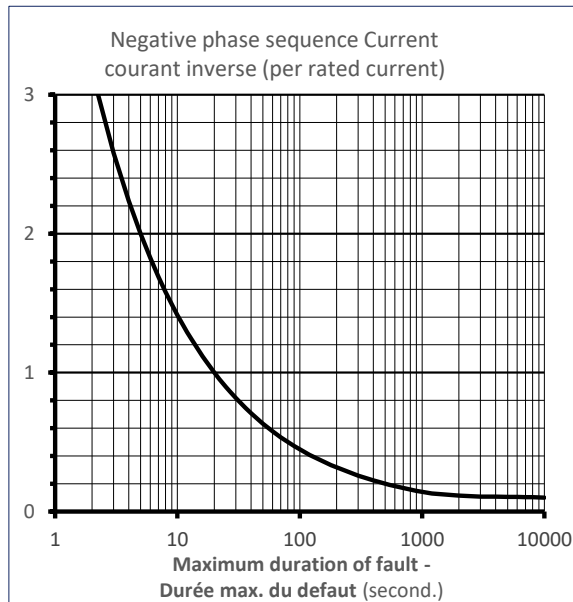
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Thermal Damage Curve



Unbalance Load Curve



Stator Earth Fault Current

