

Date: 11/01/2017

V4.051 - 12/2016

Moteurs Leroy-Somer

Project Manager : PC

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Electric Power Generation - Orleans

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PC

Main data

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Generator type:	LSA 44.3 S5 / 4p			1	
Power:	95	kVA	76 kWe	82 kWm	1
Voltage:	600	V	Star serial		1
Rated voltage range:	+5/-5%			1	
Power factor - Lagging:	0,8			1	
Frequency:	60	Hz		1	
Speed:	1800	rpm		1	
Nominal current:	91	A		1	
Winding type:	p2/3			1	
Classes (Insulation / Temperature Rise):	H / H			1	
Ambient Temperature:	50	°C		1	
Altitude:	1000	m		1	

Installation

Quantity

1

Client:	CATERPILLAR MARINE			1
Prime mover:	Reciprocating engine			1
Manufacturer:	-			1
Type:	-			1
Duty:	Base Rating			1
Industry:	Marine			1

Mechanical Construction

IM1201

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:	Cylindrical with keyway			1
Balancing - Class (ISO 1940/1):	Half key - G2,5 (std)			1
Flange:	To defined later			1
Shaft height:	270	mm		1
Width:	356	mm		1

Additional specificities

Stabilized Runaway speed:	2250 rpm - 2 min.			1
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Cooling Method

IC01

Degree of protection:	IP23			1
Coolant:	Air / Temperature: 50 °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

Connection, Excitation & Regulation

Parallel operation:	Island mode (0F)	1
Excitation:	Self-excited - Brushless - Type: AREP	1
Sustained 3-phase Isc:	> 3 x FLC for 10s.	1
AVR type:	R438	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:	On Top	1
Line side outlet:	Left hand side (seen when facing the drive end - D)	1
Gland plate:	Non magnetic - Cable gland plate not drilled	1

Protection and measurement accessories

Temperature detection

Stator windings:	6 x 3-wire Pt100 RTDs	1
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Anti-condensation heating

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

Paint:	PE - Primary - RAL 7032	1
Documentation:	PDF manual	1
Documentation Language:	English	1

Controls

QUAL/INES/006 001	Measurement of winding resistance	1
QUAL/INES/006 021	Insulation check on sensors (when fitted)	1
QUAL/INES/006 002	Voltage balance and phase order check	1
QUAL/INES/006 007	Overspeed test (according to test bench limitation)	1
QUAL/INES/006 009	High potential test	1
QUAL/INES/006 010	Insulation resistance measurement	1

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Power factor - Lagging:	0,8			1
Nominal current:	91 A	Phases	3	1
Insulation / Temperature rise:	H / H	Connexion	Star serial	1
Cooling:	IC01	Winding type:	p2/3	1
		Winding:	9 - 12 Wires	1
Ambient Temperature:	50 °C			1
Altitude:	1000 m	Overspeed (rpm)	2250	1
Duty: Base Rating		Total Harmonic Distortion (THD) < 5%		1

Efficiency (Base 95 kVA)

IEC

	25%	50%	75%	100%	110%	
Power factor - Lagging: 0,8	86,1	91,2	92,4	92,7	92,7	1
Power factor - Lagging: 1	86,8	92,3	93,9	94,5	94,6	1

Reactances (%) - (Base 95 kVA)

		<i>Unsaturated</i>		<i>Saturated</i>		<i>Unsaturated</i>		<i>Saturated</i>	
		Direct axis				Quadrature axis			
Synchronous reactance	Xd		243	172	Xq	124	88		1
Transient reactance	X'd		18,6	11,1	X'q	124	88		1
Subtransient reactance	X''d		11,0	6,6	X''q	23,1	13,9		1
Negative sequence reactance	X2		17,0	10,2					
X0	2,2	Zero sequence reactance							1
Xl	5,5	Stator leakage reactance							
Xr	13,8	Rotor leakage reactance							
Kc	0,58	Short-circuit ratio							1

Time constants (s)

		Direct axis		Quadrature axis	
Open circuit transient time constant	T'do		2,21	T'qo	NA
Short-circuit transient time constant	T'd		0,169	T'q	NA
Open circuit subtransient time constant	T''do		0,017	T''qo	0,048
Subtransient time constant	T''d		0,010	T''q	0,009
Ta	0,015	Armature time constant			

Resistances (%)

Ra	3,0	Armature resistance	R0	0,7	Zero sequence resistance	1
X/R		X/R ratio (without unit)	R2	3,4	Negative sequence resistance	

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

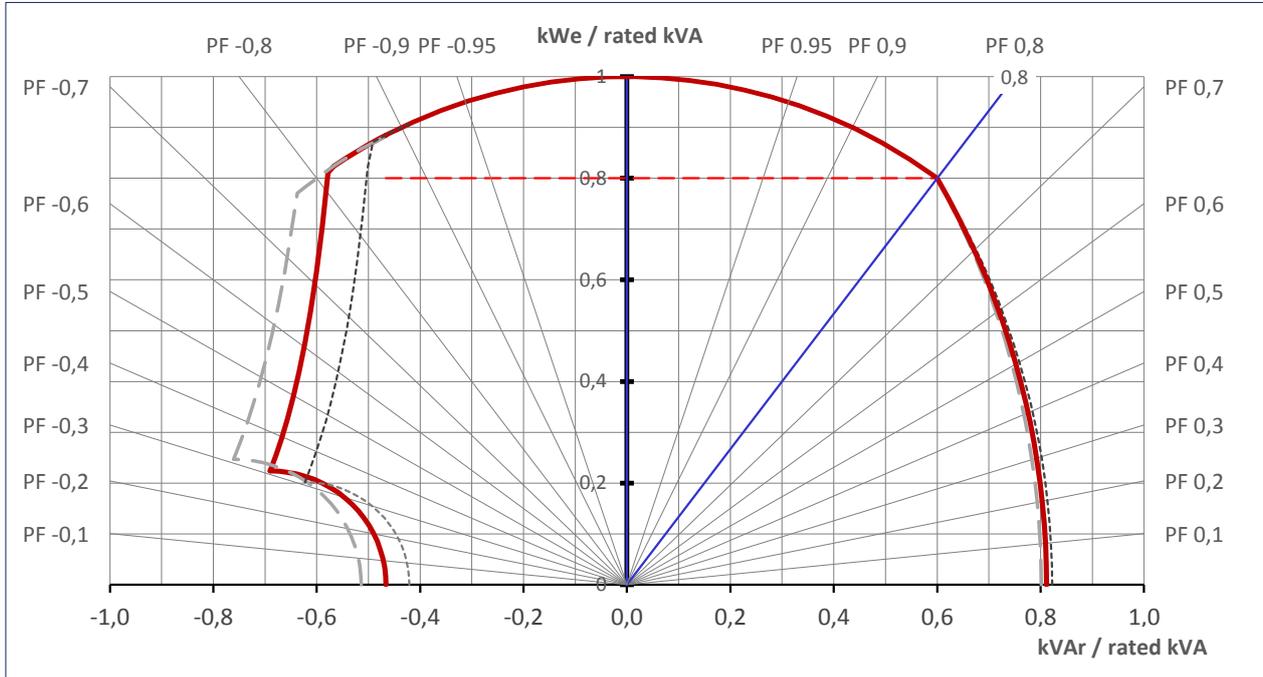
Date: 11/01/2017

95kVA - 600V - 60 Hz

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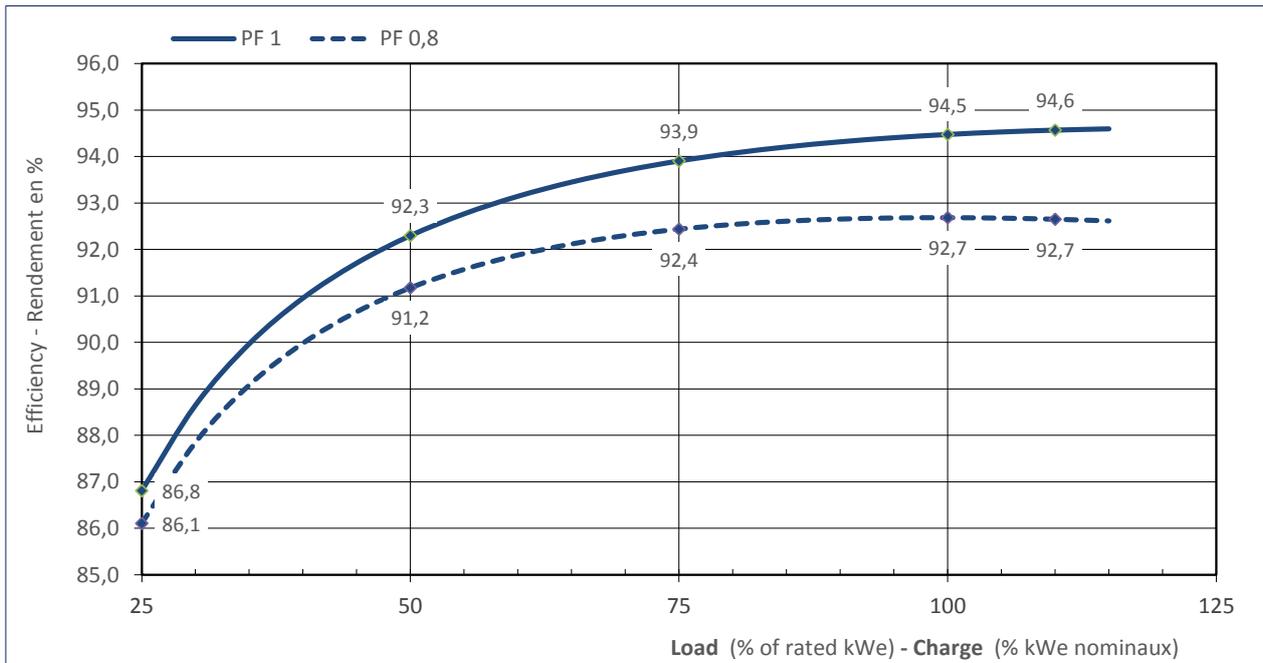
Capability Curve

---	Umax	+ 5%	630	V
—	Un		600	V
- - -	Umin	- 5%	570	V



Efficiency Curves

According to: IEC



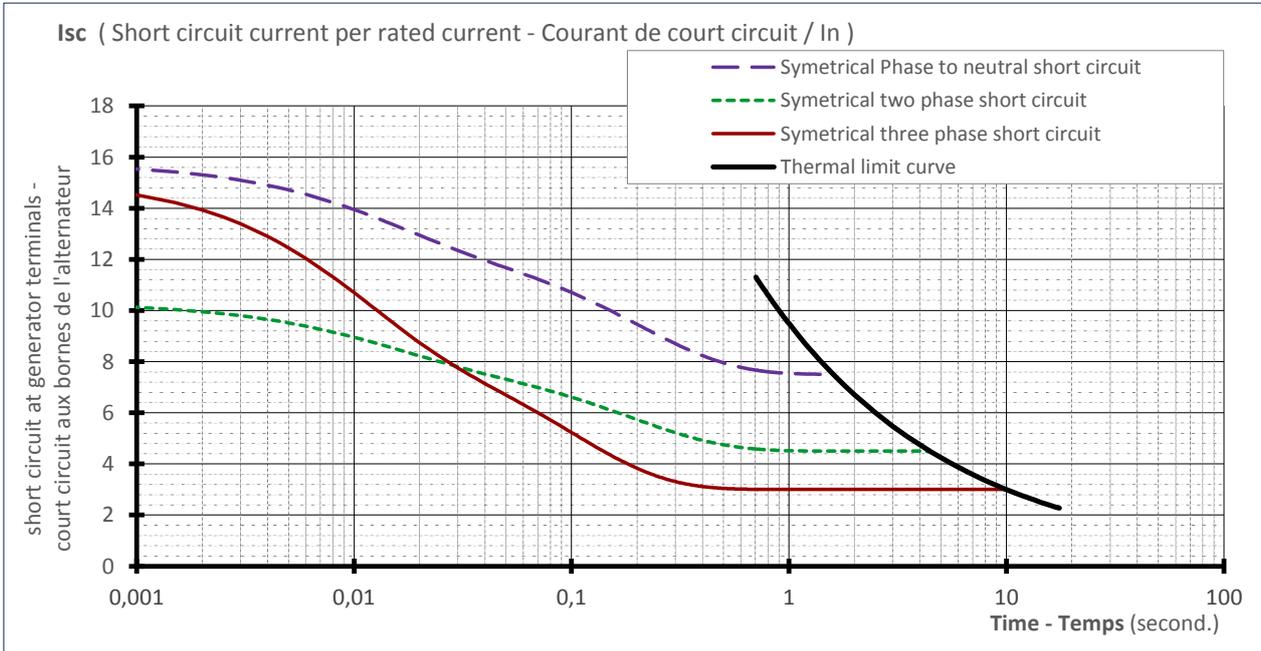
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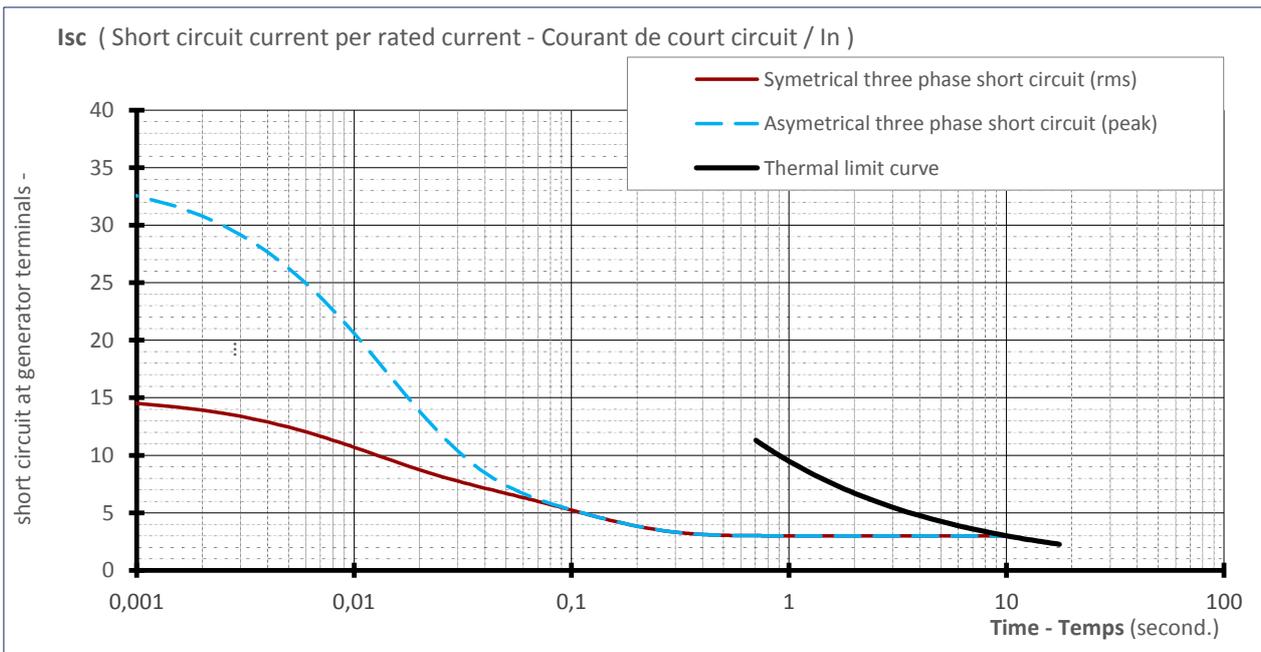
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Stator Current decrement curves

Symmetrical phase to neutral short-circuit		initial	1 414	A	15,5 x In	
Symmetrical two phase short-circuit		max	921	A	10,1 x In	In = 91 A
Symmetrical three phase short-circuit		value	1 322	A	14,5 x In	
Thermal Limit						

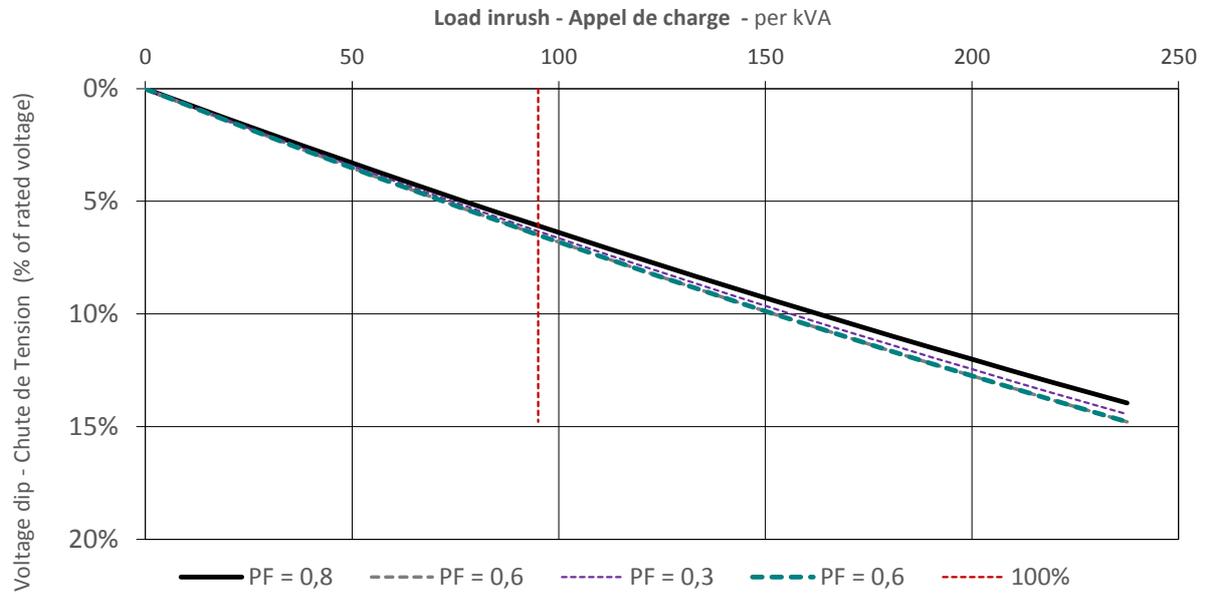


Asymmetrical three phase short-circuit IP 2 972 A 32,7 x In

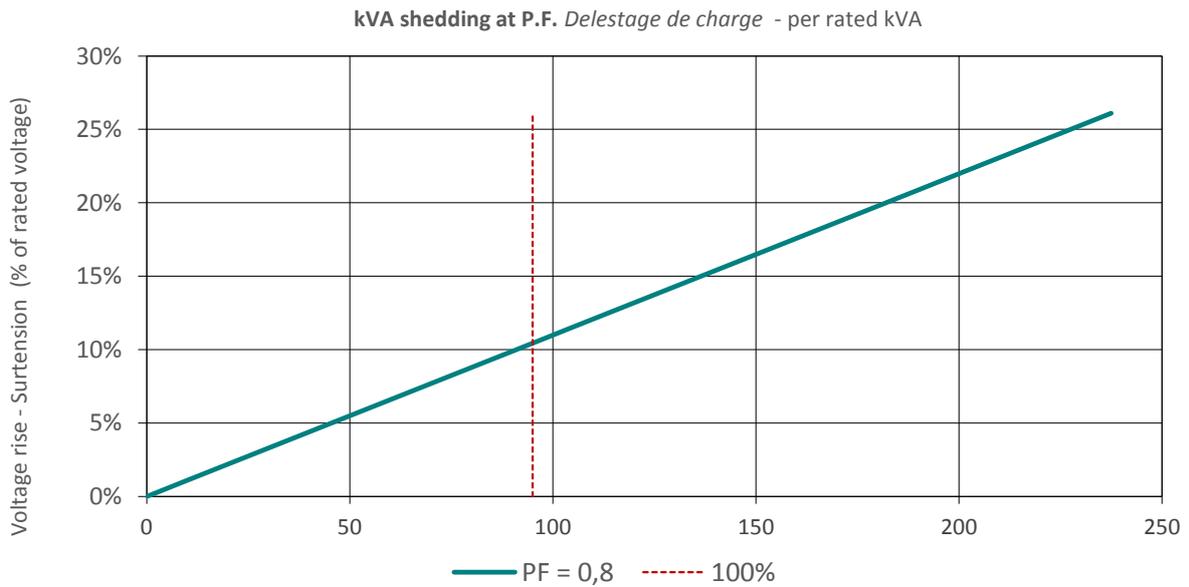


Transient Voltage Variation

Transient voltage dip curve versus load impact



Transient voltage rise curve versus load rejection

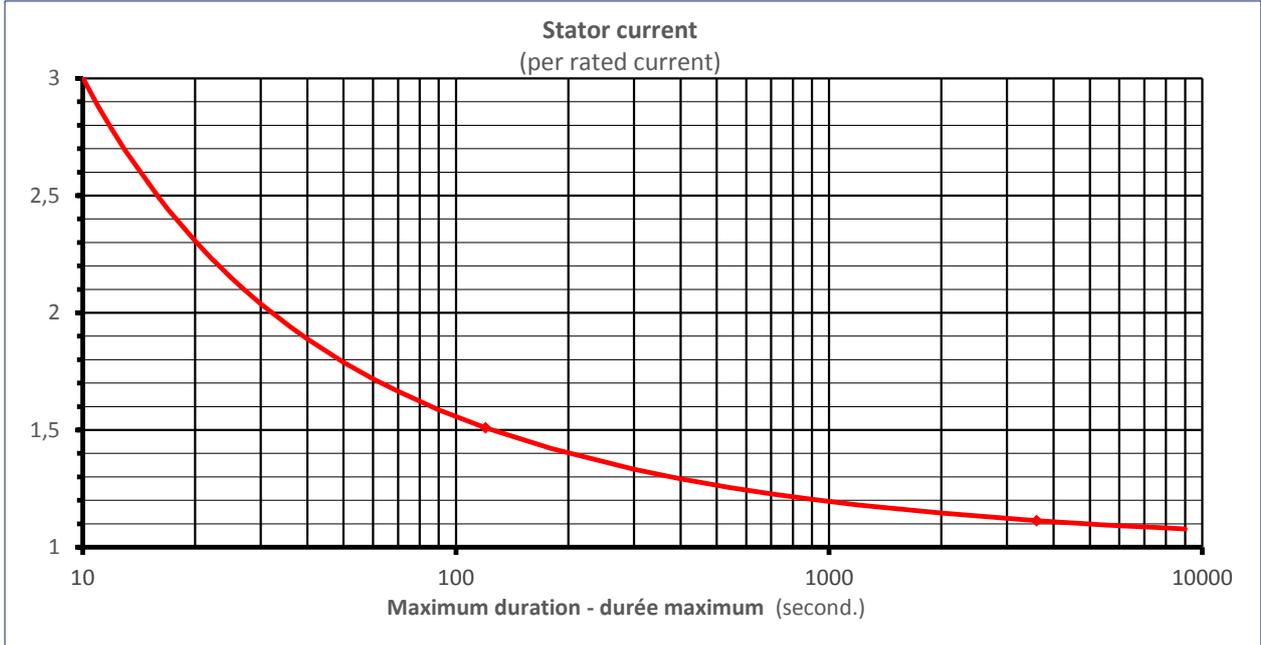


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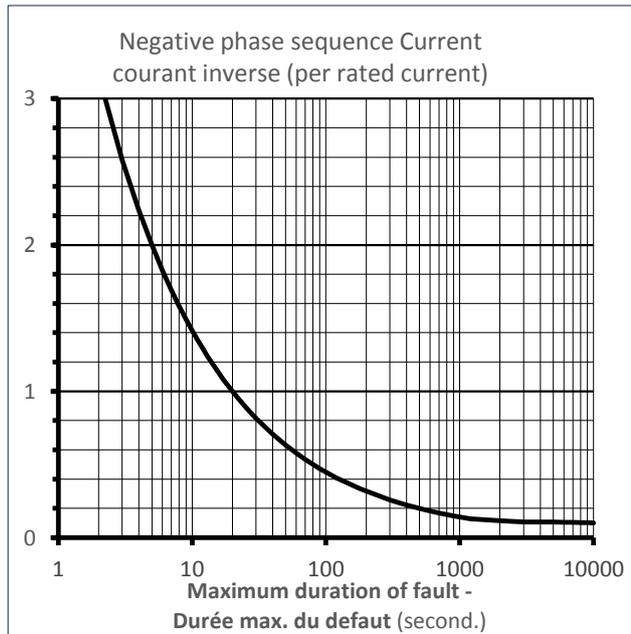
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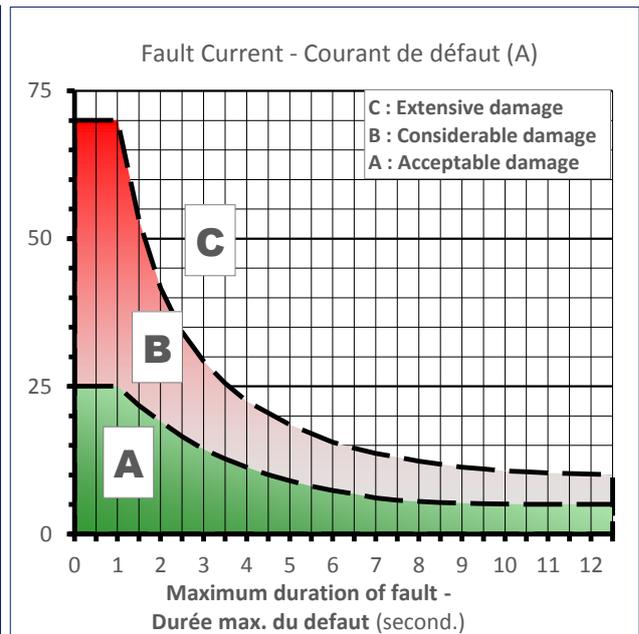
Thermal Damage Curve



Unbalance Load Curve



Stator Earth Fault Current



Alternator Modele

LSA 44.3 S5 / 4P - 1800 rpm - 60 Hz - 3 Phase - PF 0,8 - IC01

Power:

Ambient Voltage (V)	class B	Class F				Class H			
	40°	40	45°	Marine	40°	40	45°	Marine	40°
	Continuous				Std-By	Continuous			
380	50,0	57,0	50,2	50,2	60,6	62,5	60,8	60,8	66,5
400	57,5	65,6	57,7	57,7	69,7	71,9	69,9	69,9	76,5
415	62,7	71,4	62,9	62,9	76,0	78,3	76,2	76,2	83,3
440	70,5	80,3	70,8	70,8	85,5	88,1	85,7	85,7	93,7
450	73,3	83,6	73,7	73,7	89,0	91,7	89,2	89,2	97,5
460	76,1	86,7	76,4	76,4	92,3	95,1	92,5	92,5	101,2
480	81,3	92,6	81,6	81,6	98,6	101,6	98,8	98,8	108,1