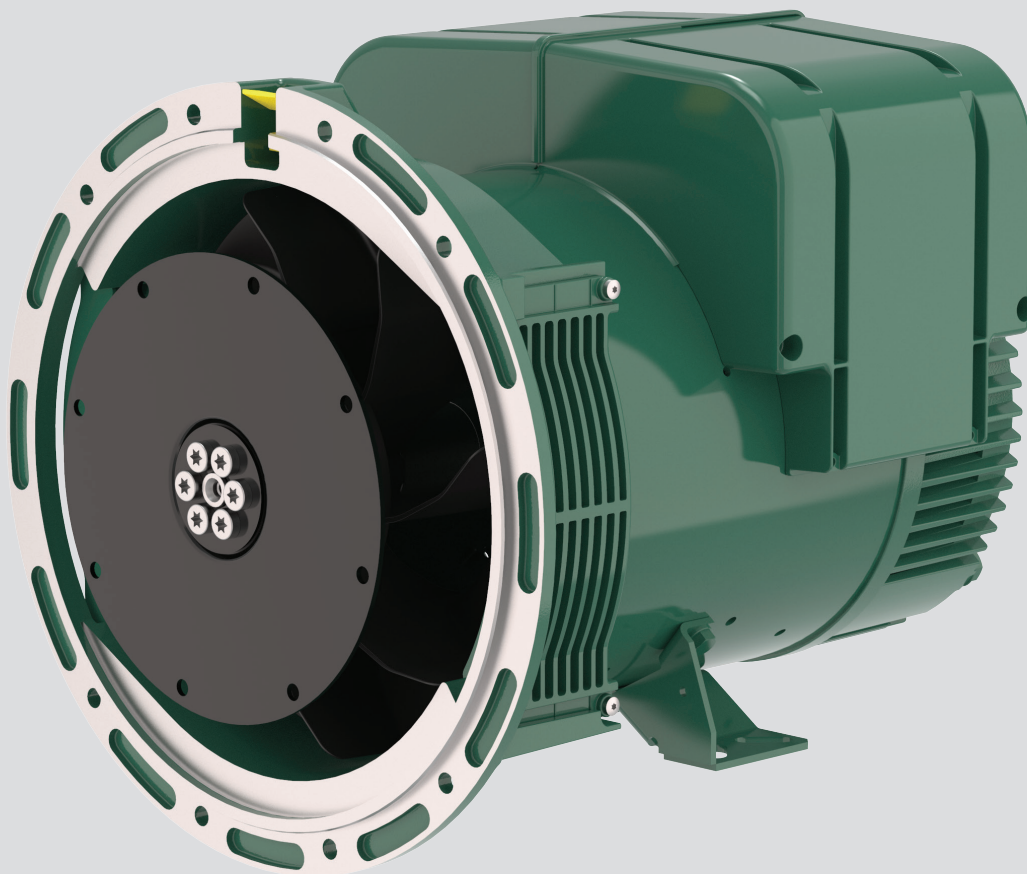




LSA 40

Low Voltage Alternator - 4 pole

10 to 20 kVA - 50 Hz / 12.5 to 25 kVA - 60 Hz

Electrical and mechanical data

LEROY-SOMER™

Nidec
All for dreams

The best of performance

Nidec Leroy-Somer LSA 40 alternator has been designed to offer you the best power generation performances. With its meticulous design and optimized architecture, the LSA 40 strikes the perfect balance between compactness, reliability, performance and longevity.

Whatever your application, the LSA 40 will meet your needs and will adapt to all situations.

Standards

Nidec Leroy-Somer LSA 40 alternator meets all key international standards and regulations, including IEC 60034, NEMA MG 1.32-33, ISO 8528-3, CSA C22.2 n°100-14 and UL 1446 (UL 1004 on request). Also compliant with IEC 61000-6-2, IEC 61000-6-3, IEC 61000-6-4, VDE 0875G, VDE 0875N and EN 55011, group 1 class A for European zone.

Nidec Leroy-Somer LSA 40 alternator can be integrated in EC marked generator set, and bears EC, EAC and CMIM markings. It is designed, manufactured and marketed in an ISO 9001 and ISO 14001 quality assurance environment.

Electrical characteristics and performances

- Class H insulation
- 2/3 pitch winding, standard 12-wire (6) reconnectable
- Voltage range:
 - 50 Hz: 220V - 240V and 380V - 415V (440V)
 - 60 Hz: 208V - 240V and 380V - 480V
- High efficiency and motor starting capacity
- Other voltages are possible with optional adapted windings:
 - 50 Hz: 440V (no. 7), 500V (no. 9)
 - 60 Hz: 380V and 416V (no. 8), 600V (no. 9)

Excitation and regulation system

Excitation system			Regulation options		
AVR	SHUNT	AREP (option)	C.T. Current transformer for paralleling	Mains paralleling	Remote voltage potentiometer
R220	Standard				
D350	Option	Standard	√*		√
D550**	Option	Option	√*	√	√

*: only with AREP **: external mounting

3-phase sensing is included as a standard with digital regulators.

Protection system and options

- The LSA 40 is IP 23
- Complete winding protection for clean environments with relative humidity $\leq 95\%$, including indoor marine environments
- Options:
 - Filters on air inlet: derating 5%
 - Filters on air inlet and air outlet (IP 44): derating 10%
 - Reinforced winding protection for harsh environments and relative humidity greater than 95%
 - Space heater
 - Thermal protection for stator windings
 - Shaft height: H = 180 mm (to be specified when ordering)

Mechanical construction

- Compact and rigid assembly to better withstand generator vibrations
- Steel frame and terminal box
- Aluminum flanges and shields
- Two-bearing and single-bearing versions designed to be suitable for commercially-available heat engines
- Half-key balancing
- Greased for life bearings (20 000h)
- Direction of rotation: clockwise and anti-clockwise (without derating)

Terminal box design

- Easy access to the voltage regulator and to the connections
- 8-way terminal block for reconnecting the voltage
- Predrilled holes for cable gland



LSA 40 - 10 to 20 kVA - 50 Hz / 12.5 to 25 kVA - 60 Hz

General characteristics

Insulation class	H	Excitation system	SHUNT	AREP
Winding pitch	2/3 (wind. 6)	AVR type	R220	D350
Number of wires	12	Voltage regulation (*)	± 0.5%	± 0.25%
Protection	IP 23	Short-circuit current	-	300% (3 IN): 10 s
Altitude	≤ 1000 m	Total Harmonic Distortion THD (**) in no-load	< 3%	
Overspeed	2250 R.P.M.	Total Harmonic Distortion THD (**) on linear load	< 5%	
Air flow	0.06 m³/s (50 Hz) - 0.072 m³/s (60 Hz)	Waveform: NEMA = TIF (**)	< 50	

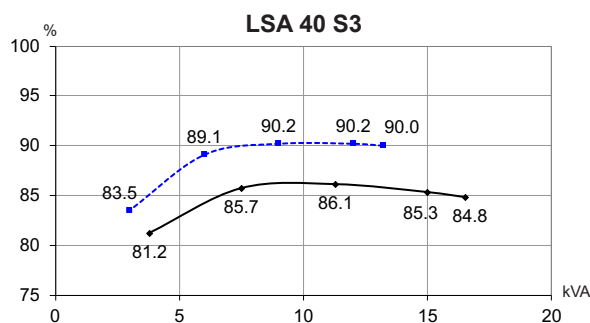
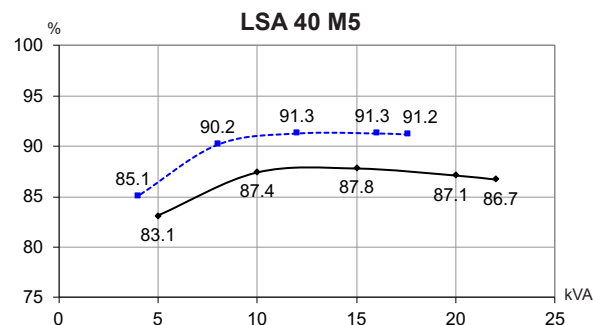
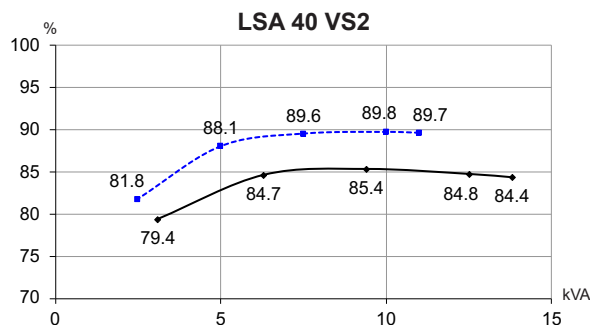
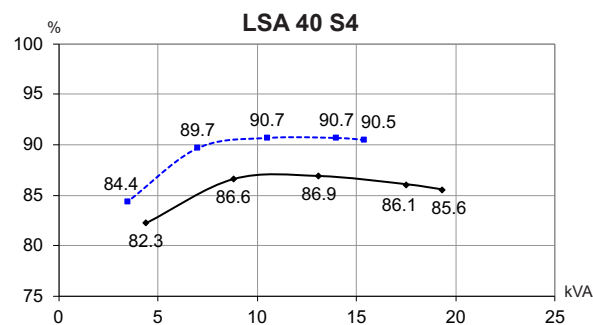
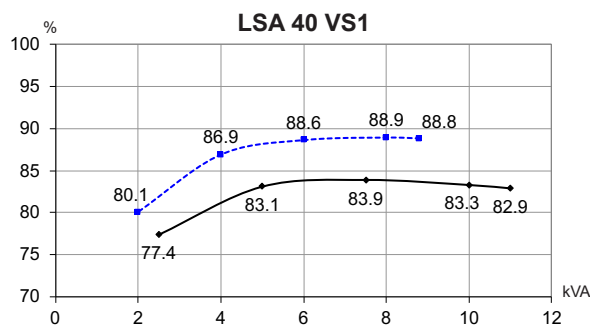
(*) Steady state (**) Total harmonic distortion between phases, in no-load or on linear load

Ratings 50 Hz - 1500 R.P.M.

kVA / kW - P.F. = 0.8																						
Duty/T°C		Continuous duty/40°C					Continuous duty/40°C					Stand-by/40°C					Stand-by/27°C					
Class/T°K		H/125°K					F/105°K					H/150°K					H/163°K					
Phase		3 ph.			1 ph.		3 ph.			1 ph.		3 ph.			1 ph.		3 ph.			1 ph.		
Y		380V	400V	415V	440V	ΔΔ	380V	400V	415V	440V	ΔΔ	380V	400V	415V	440V	ΔΔ	380V	400V	415V	440V	ΔΔ	
Δ		220V	230V	240V		230V	220V	230V	240V		230V	220V	230V	240V		230V	220V	230V	240V		230V	
YY		200V			220V	200V			220V	200V			220V	200V			220V	200V			220V	
LSA 40 VS1		kVA	10	10	10	9	7	9	9	9	8	6.5	10.5	10.5	10.5	9.5	7.5	11	11	11	10	8
		kW	8	8	8	7	5.5	7	7	7	6.5	5	8.5	8.5	8.5	7.5	6	9	9	9	8	6.5
LSA 40 VS2		kVA	12.5	12.5	12.5	11	9	11.5	11.5	11.5	10	8	13.5	13.5	13.5	12	9.5	14	14	14	12.5	10
		kW	10	10	10	9	7	9	9	9	8	6.5	11	11	11	9.5	7.5	11	11	11	10	8
LSA 40 S3		kVA	15	15	15	13	10.5	14	14	14	12	10	16	16	16	14	11.5	16.5	16.5	16.5	15	12
		kW	12	12	12	10.5	8.5	11	11	11	9.5	8	13	13	13	11	9	13	13	13	12	9.5
LSA 40 S4		kVA	17.5	17.5	17.5	16	12.5	16	16	16	14.5	11.5	19	19	19	17	13.5	19.5	19.5	19.5	17.5	14
		kW	14	14	14	13	10	13	13	13	11.5	9	15	15	15	13.5	11	15.5	15.5	15.5	14	11
LSA 40 M5		kVA	20	20	20	18	14	18.5	18.5	18.5	16.5	13	21.5	21.5	21.5	19	15	22	22	22	20	15.5
		kW	16	16	16	14.5	11	15	15	15	13	10.5	17	17	17	15	12	17.5	17.5	17.5	16	12.5

Ratings 60 Hz - 1800 R.P.M.

kVA / kW - P.F. = 0.8																						
Duty/T°C		Continuous duty/40°C					Continuous duty/40°C					Stand-by/40°C					Stand-by/27°C					
Class/T°K		H/125°K					F/105°K					H/150°K					H/163°K					
Phase		3 ph.			1 ph.		3 ph.			1 ph.		3 ph.			1 ph.		3 ph.			1 ph.		
Y		380V	416V	440V	480V	ΔΔ	380V	416V	440V	480V	ΔΔ	380V	416V	440V	480V	ΔΔ	380V	416V	440V	480V	ΔΔ	
Δ		220V	240V			240V	220V	240V			240V	220V	240V			240V	220V	240V			240V	
YY		208V			220V	240V	208V			220V	240V	208V			220V	240V	208V			220V	240V	
LSA 40 VS1		kVA	10	11	11.5	12.5	9	9.5	10.5	10.5	11.5	8.5	11	11.5	12.5	13.5	9.5	11.5	12	13	14	10
		kW	8	9	9	10	7	7.5	8.5	8.5	9	7	9	9	10	11	7.5	9	9.5	10.5	11	8
LSA 40 VS2		kVA	12.5	13.5	14.5	15.5	11.5	11.5	12.5	13.5	14.5	10.5	13.5	14.5	15.5	16.5	12	14	15	16	17	12.5
		kW	10	11	11.5	12.5	9	9	10	11	11.5	8.5	11	11.5	12.5	13	9.5	11	12	13	13.5	10
LSA 40 S3		kVA	15	16.5	17.5	19	13	14	15.5	16.5	17.5	12	16	18	19	20	14	17	18.5	19.5	21	14.5
		kW	12	13	14	15	10.5	11	12.5	13	14	9.5	13	14.5	15	16	11	13.5	15	15.5	17	11.5
LSA 40 S4		kVA	17.5	19	20	22	14.5	16.5	18	19	20.5	13	19	20.5	21.5	23.5	15.5	19.5	21	22	24.5	16
		kW	14	15	16	17.5	11.5	13	14.5	15	16.5	10.5	15	16.5	17	19	12.5	15.5	17	17.5	19.5	13
LSA 40 M5		kVA	20	22	23	25	16	18.5	20.5	21.5	23	15	21.5	23.5	25	27	17	22	24.5	26	27.5	17.5
		kW	16	17.5	18.5	20	13	15	16.5	17	18.5	12	17	19	20	21.5	13.5	17.5	19.5	21	22	14

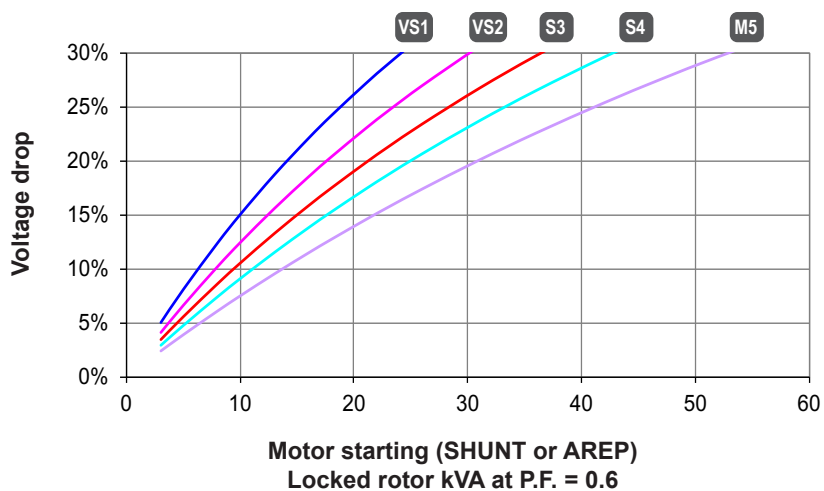
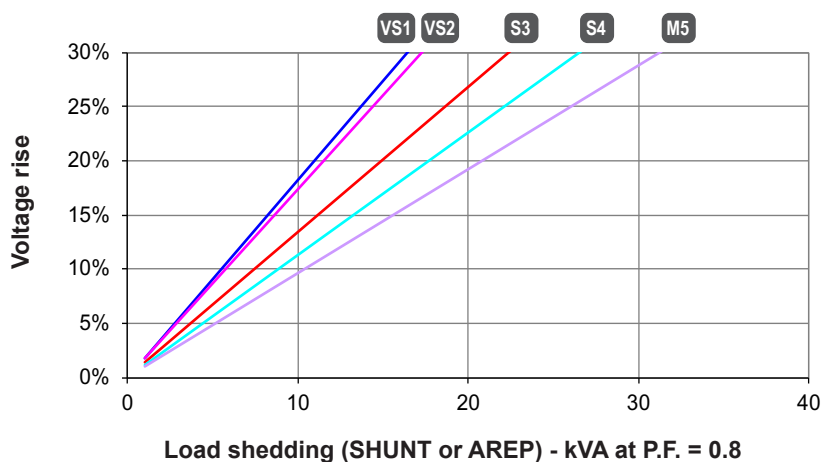
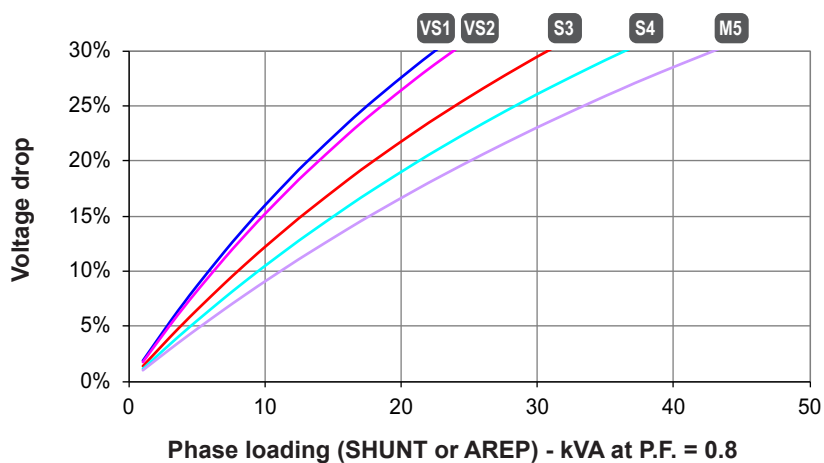
Efficiencies 400 V - 50 Hz (— P.F.: 0.8) (..... P.F.: 1)

Reactances (%). Time constants (ms) - Class H / 400 V

	VS1	VS2	S3	S4	M5
Kcc Short-circuit ratio	0.7	0.67	0.6	0.6	0.61
Xd Direct-axis synchronous reactance unsaturated	167	174	190	195	193
Xq Quadrature-axis synchronous reactance unsaturated	85	88	97	99	98
T'do No-load transient time constant	719	790	837	878	926
X'd Direct-axis transient reactance saturated	17.2	16.3	16.8	16.4	15.4
T'd Short-circuit transient time constant	74	74	74	74	74
X''d Direct-axis subtransient reactance saturated	8.6	8.1	8.4	8.2	7.7
T''d Subtransient time constant	7	7	7.4	7	7
X''q Quadrature-axis subtransient reactance saturated	16.1	15.9	16.8	16.8	16.2
Xo Zero sequence reactance	0.71	0.68	0.7	0.68	0.64
X2 Negative sequence reactance saturated	12.36	12.04	12.66	12.55	12.01
Ta Armature time constant	11	11	11	11	11

Other class H / 400 V data

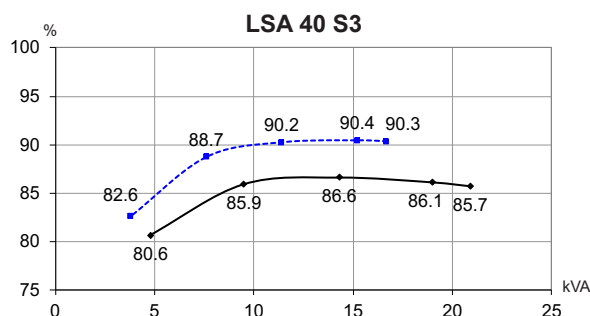
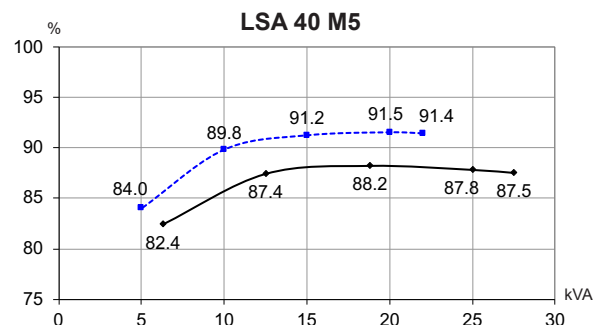
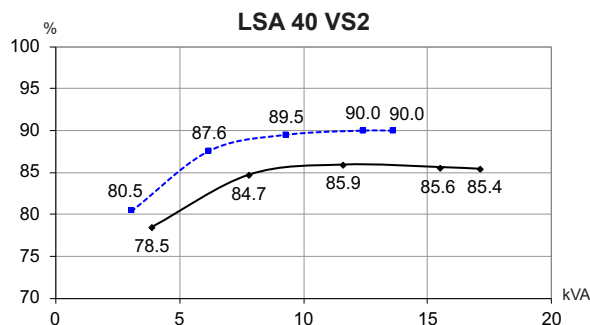
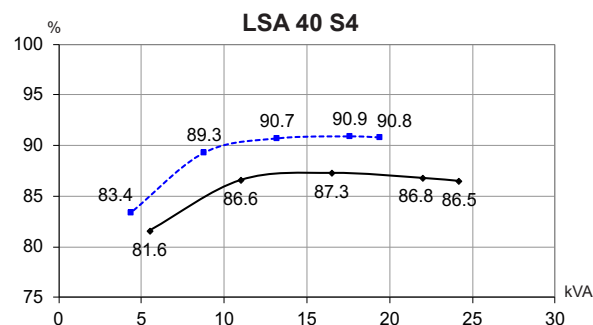
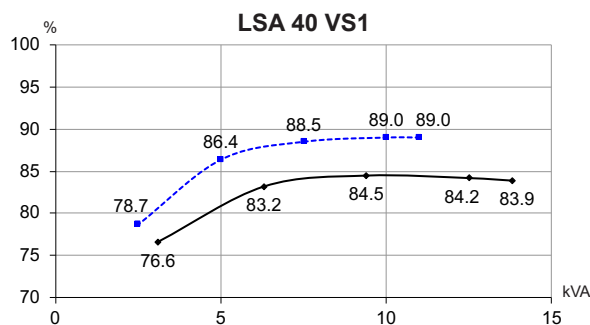
io (A) No-load excitation current SHUNT / AREP	0.77 / 1.06	0.78 / 1.06	0.76 / 1.03	0.75 / 1.03	0.72 / 0.98
ic (A) On-load excitation current SHUNT / AREP	1.94 / 2.65	1.97 / 2.69	2.05 / 2.79	2.06 / 2.8	1.95 / 2.66
uc (V) On-load excitation voltage SHUNT / AREP	23.7 / 17.1	24 / 17.3	24.9 / 17.9	24.9 / 18	23.6 / 17
ms Response time ($\Delta U = 20\%$ transient)	500	500	500	500	500
kVA Start ($\Delta U = 20\%$ cont. or $\Delta U = 30\%$ trans.) SHUNT / AREP	24.6	29.9	36.1	43.3	52.7
% Transient ΔU (on-load 4/4) SHUNT / AREP - P.F.: 0.8 _{LAG}	16.1	18.4	17.3	17.1	16.7
W No-load losses	461	514	540	590	645
W Heat dissipation	1597	1784	2063	2255	2352

Transient voltage variation 400V - 50 Hz



1) For a starting P.F. other than 0.6, the starting kVA must be multiplied by $K = \text{Sine P.F.} / 0.6$

2) For voltages other than 400V (Y), 230V (Δ) at 50 Hz, then kVA must be multiplied by $(400/U)^2$ or $(230/U)^2$.

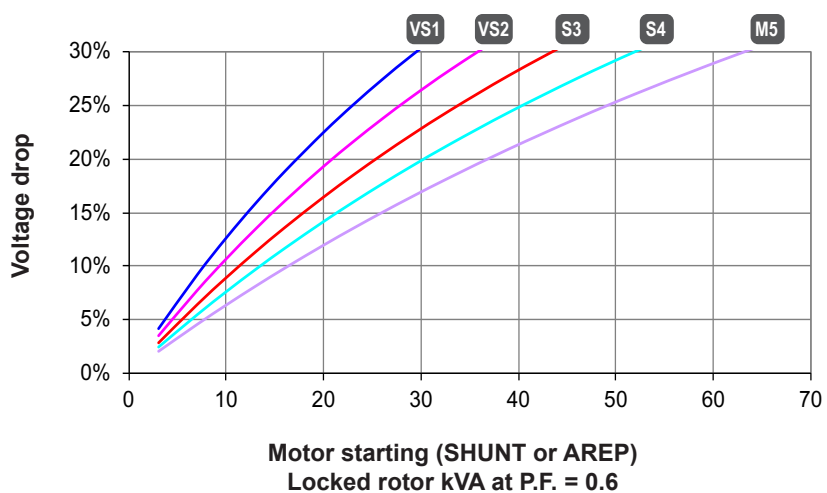
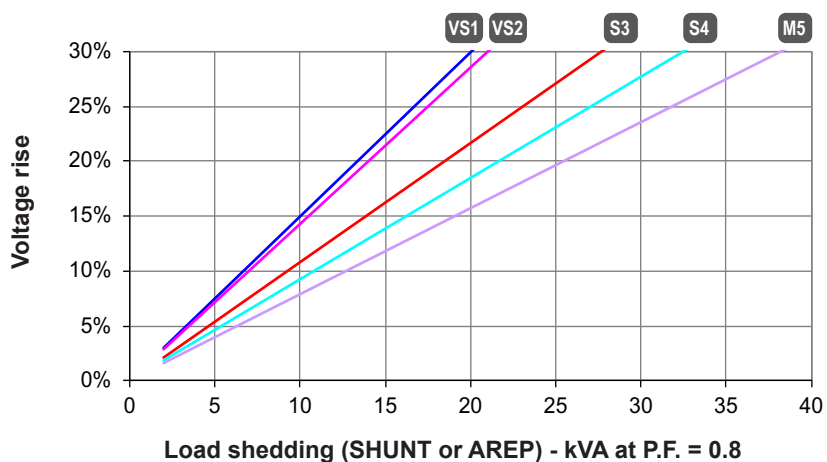
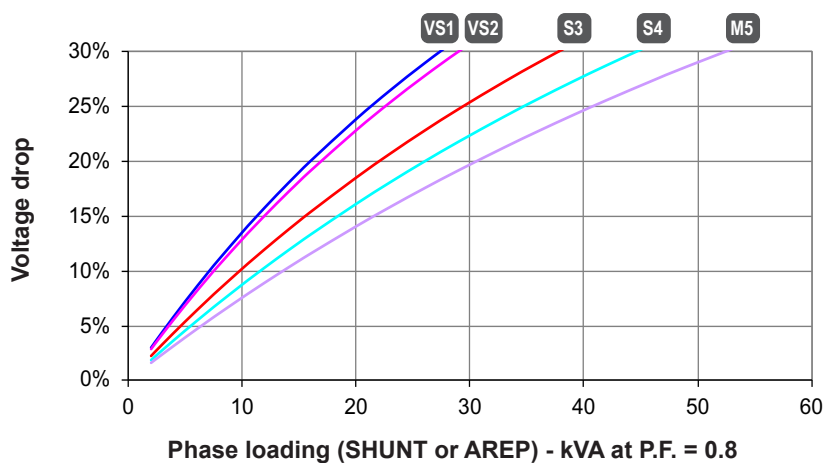
Efficiencies 480 V - 60 Hz (— P.F.: 0.8) (..... P.F.: 1)

Reactances (%). Time constants (ms) - Class H / 480 V

	VS1	VS2	S3	S4	M5
Kcc Short-circuit ratio	0.67	0.65	0.57	0.57	0.58
Xd Direct-axis synchronous reactance unsaturated	174	180	201	204	201
Xq Quadrature-axis synchronous reactance unsaturated	88	91	102	104	102
T'do No-load transient time constant	719	790	837	878	926
X'd Direct-axis transient reactance saturated	17.9	16.8	17.8	17.2	16.1
T'd Short-circuit transient time constant	74	74	74	74	74
X''d Direct-axis subtransient reactance saturated	8.9	8.4	8.9	8.6	8
T''d Subtransient time constant	7	7	7.4	7	7
X''q Quadrature-axis subtransient reactance saturated	16.7	16.4	17.8	17.6	16.9
Xo Zero sequence reactance	0.74	0.7	0.74	0.71	0.67
X2 Negative sequence reactance saturated	12.87	12.44	13.36	13.15	12.51
Ta Armature time constant	11	11	11	11	11

Other class H / 480 V data

io (A) No-load excitation current SHUNT / AREP	0.77 / 1.06	0.77 / 1.06	0.76 / 1.03	0.75 / 1.02	0.72 / 0.98
ic (A) On-load excitation current SHUNT / AREP	1.97 / 2.69	1.99 / 2.71	2.1 / 2.86	2.1 / 2.86	1.97 / 2.69
uc (V) On-load excitation voltage SHUNT / AREP	24.1 / 17.4	24.3 / 17.5	25.6 / 18.5	25.5 / 18.4	24 / 17.3
ms Response time ($\Delta U = 20\%$ transient)	500	500	500	500	500
kVA Start ($\Delta U = 20\%$ cont. or $\Delta U = 30\%$ trans.) SHUNT / AREP	29.4	35.8	43.3	51.9	63.1
% Transient ΔU (on-load 4/4) SHUNT / AREP - P.F.: 0.8 _{LAG}	16.4	18.7	17.7	17.5	17
W No-load losses	643	717	755	825	904
W Heat dissipation	1866	2069	2447	2654	2763

Transient voltage variation 480V - 60 Hz



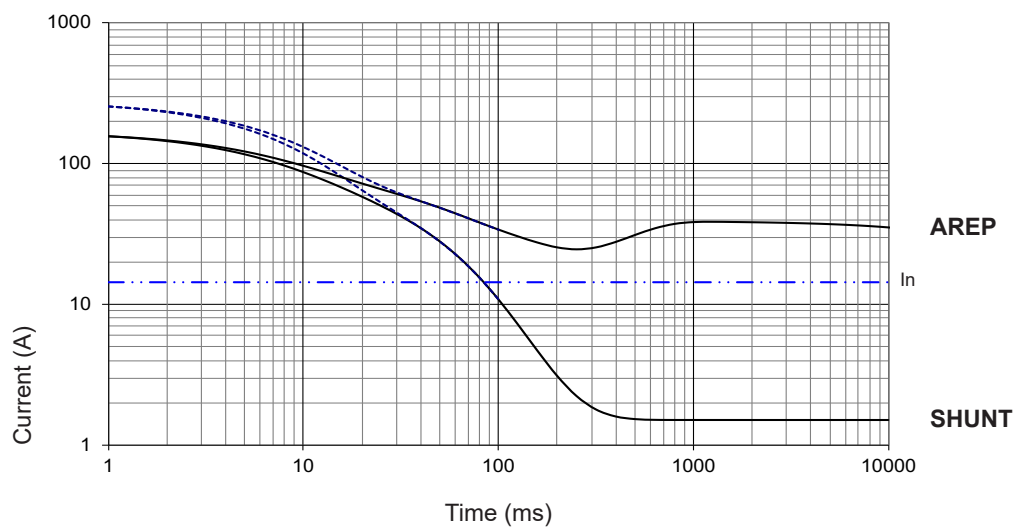
1) For a starting P.F. other than 0.6, the starting kVA must be multiplied by $K = \text{Sine P.F.} / 0.8$

2) For voltages other than 480V (Y), 277V (Δ), 240V (YY) at 60 Hz, then kVA must be multiplied by $(480/U)^2$ or $(277/U)^2$ or $(240/U)^2$.

3-phase short-circuit curves at no load and rated speed (star connection Y)

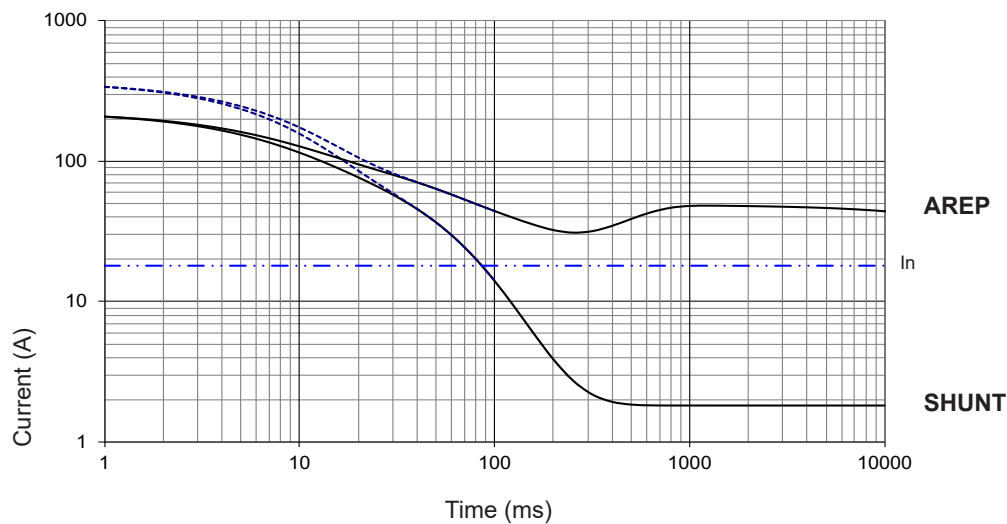
LSA 40 VS1

Symmetrical —
Asymmetrical - - -



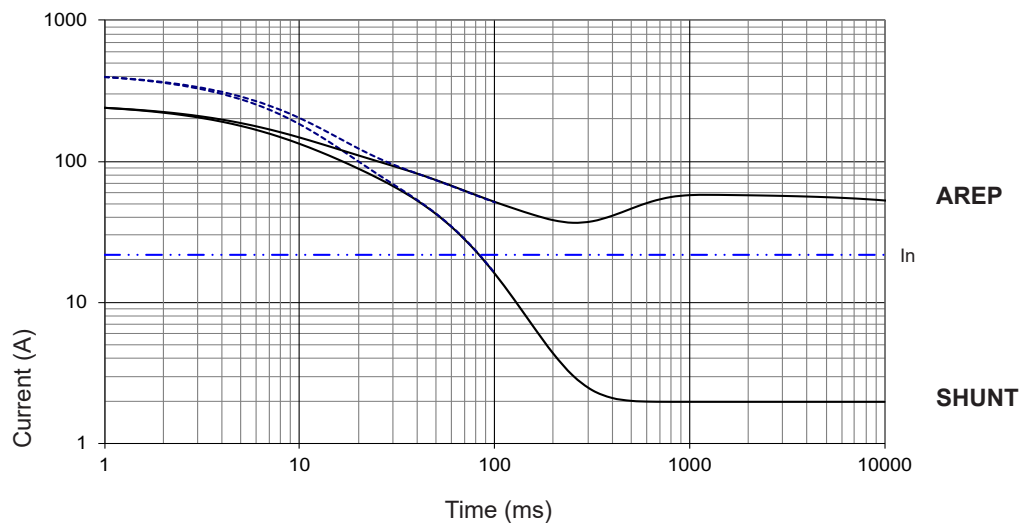
LSA 40 VS2

Symmetrical —
Asymmetrical - - -



LSA 40 S3

Symmetrical —
Asymmetrical - - -



Influence due to connection

Curves shown are for star (Y) connection.

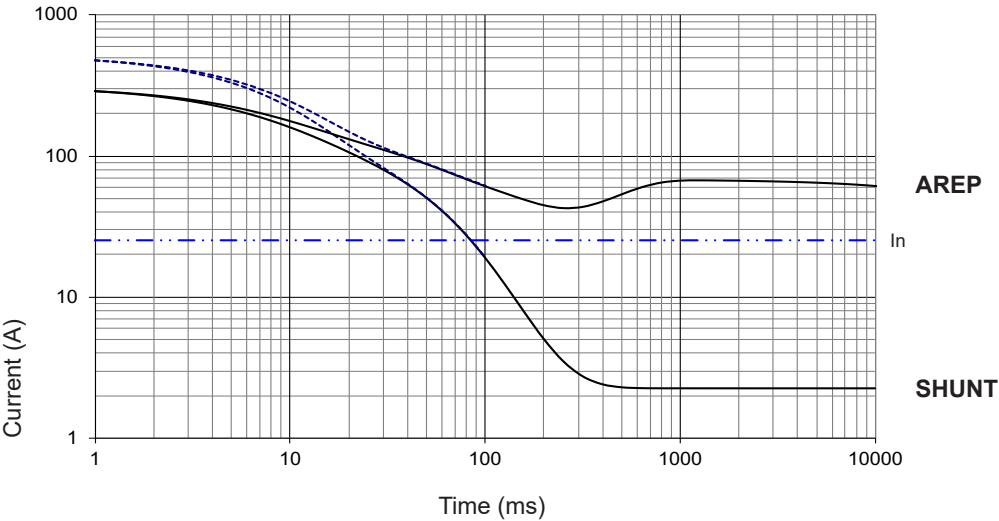
For other connections, use the following multiplication factors:

- Series delta : current value x 1.732 - Parallel star : current value x 2

3-phase short-circuit curves at no load and rated speed (star connection Y)

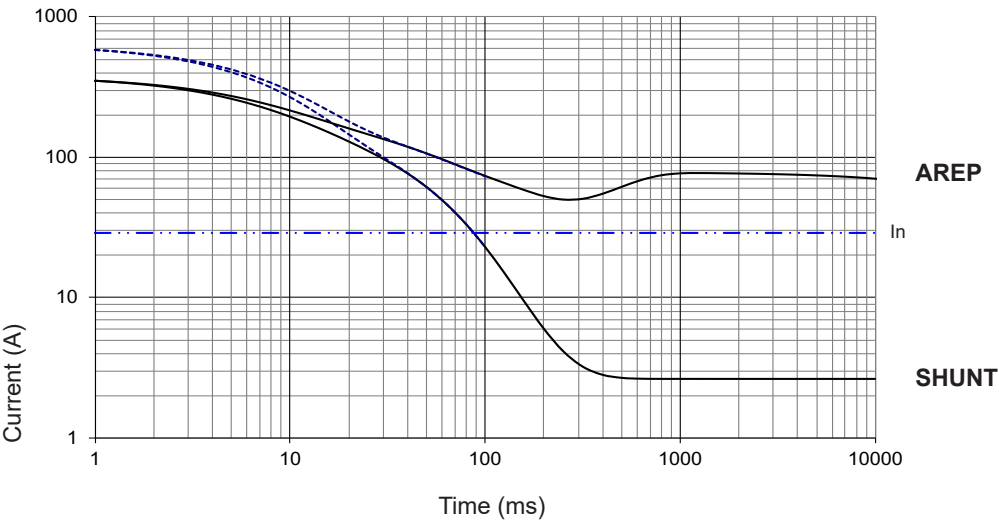
LSA 40 S4

Symmetrical —
Asymmetrical - - -



LSA 40 M5

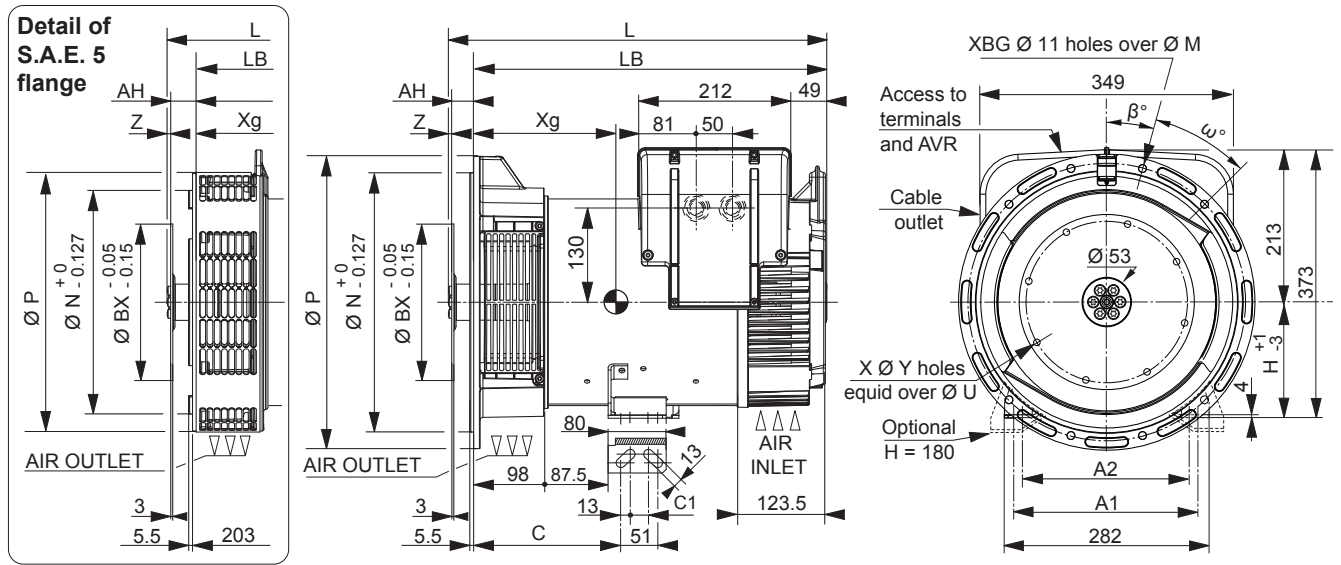
Symmetrical —
Asymmetrical - - -



Influence due to short-circuit
Curves are based on a three-phase short-circuit.
For other types of short-circuit, use the following multiplication factors.

	3-phase	2-phase L/L	1-phase L/N
Instantaneous (max.)	1	0.87	1.3
Continuous	1	1.5	2.2
Maximum duration (AREP)		1.5	

Single-bearing dimensions



Dimensions (mm) and weight				
Type	L maxi*	LB	Xg	Weight (kg)
LSA 40 VS1	469	407	186	73
LSA 40 VS2	469	407	196	80
LSA 40 S3	499	437	204	87
LSA 40 S4	499	437	221	92
LSA 40 M5	519	457	221	102

* L maxi = LB + AH maxi + Z

Flange (mm)						
S.A.E.	P	N	M	XBG	β°	ω°
5	358	314.32	333.38	8	22°30'	45°
4	408	361.95	381	8*	15°	30°
3	460	409.58	428.62	8*	15°	30°

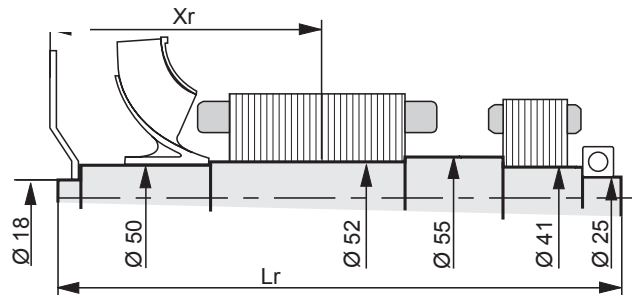
* Four lateral holes removal on S.A.E. 3 and 4

Shaft height (mm)		
	Standard	Option
H	160	180
Feet length		
C	203	238
C1	25	22
A1	254	279
A2	230	243

Coupling				
Flange	3	4	5	
Flex plate				
11 1/2	x	-	-	
10	x	x	-	
8	x	x	-	
7 1/2	-	x	x	
6 1/2	-	x	x	

Flex plate (mm)						
S.A.E.	BX	U	X	Y	AH	Z
11 1/2	352.42	333.38	8	11	39.6	0
10	314.32	295.28	8	11	53.8	0
8	263.52	244.48	6	11	62	0
7 1/2	241.3	222.25	8	9	30.2	6
6 1/2	215.9	200.02	6	9	30.2	6

Torsional analysis data

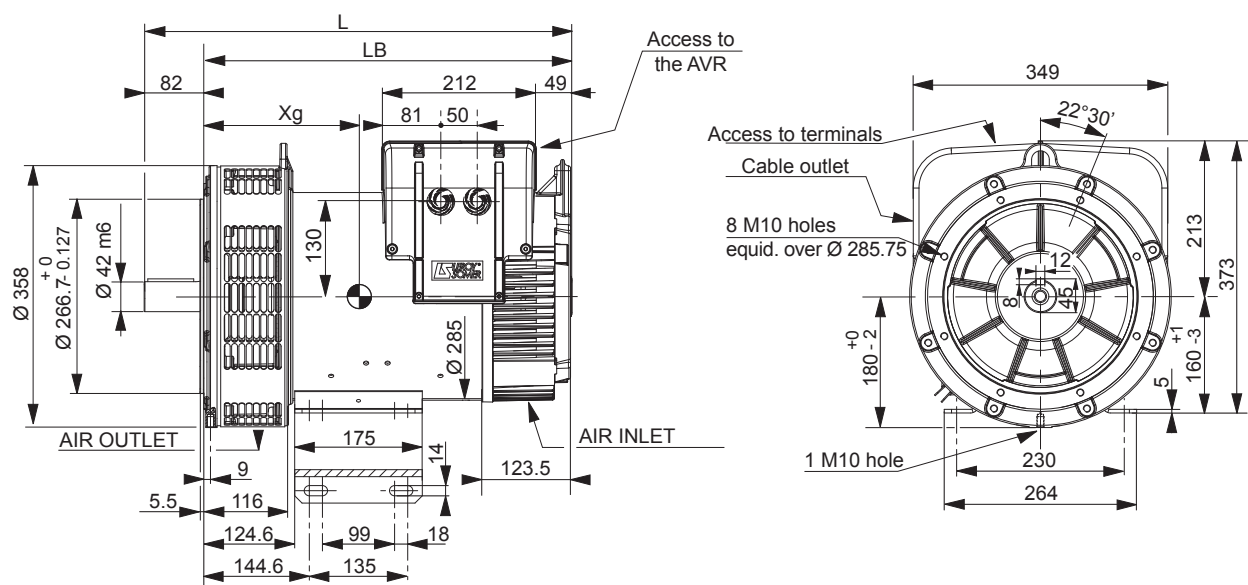


Centre of gravity: Xr (mm), Rotor length: Lr (mm), Weight: M (kg), Moment of inertia: J (kgm²): (4J = MD²)																
Flex plate	S.A.E. 6 1/2				S.A.E. 7 1/2				S.A.E. 8				S.A.E. 10			
Type	Xr	Lr	M	J	Xr	Lr	M	J	Xr	Lr	M	J	Xr	Lr	M	J
LSA 40 VS1	211.7	428	25.54	0.0779	211.7	428	25.7	0.0802	243.5	428	26	0.0847	238.3	428	26.5	0.0964
LSA 40 VS2	221.7	428	27.95	0.0867	221.7	428	28.11	0.0890	253.5	428	28.41	0.0935	248.3	428	28.91	0.1052
LSA 40 S3	229.2	458	30.32	0.0936	229.2	458	30.48	0.0959	261	458	30.78	0.1004	255.8	458	31.28	0.1121
LSA 40 S4	236.7	458	32.23	0.1004	236.7	458	32.39	0.1027	268.5	458	32.69	0.1072	263.3	458	33.19	0.1189
LSA 40 M5	246.7	478	35.26	0.1102	246.7	478	35.42	0.1125	278.5	478	35.72	0.1170	273.3	478	36.22	0.1287

NOTE : Dimensions are for information only and may be subject to modifications. Contractual 2D drawings can be downloaded from the Leroy-Somer site, 3D drawing files are available upon request.

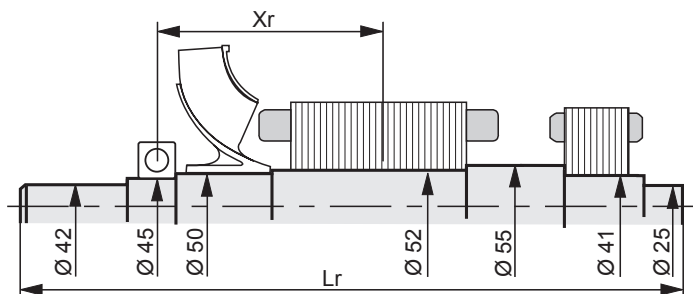
The torsional analysis of the transmission is imperative. All values are available upon request.

Two-bearing dimensions



Dimensions (mm) and weight				
Type	L	LB	Xg	Weight (kg)
LSA 40 VS1	507	425	198	82
LSA 40 VS2	507	425	208	89
LSA 40 S3	537	455	216	96
LSA 40 S4	537	455	233	101
LSA 40 M5	557	475	233	109

Torsional analysis data



Centre of gravity: Xr (mm), Rotor length: Lr (mm), Weight: M (kg), Moment of inertia: J (kgm²): (4J = MD²)				
Type	Xr	Lr	M	J
LSA 40 VS1	176.5	450.2	25.38	0.0731
LSA 40 VS2	186.5	450.2	27.79	0.0819
LSA 40 S3	194	480.2	30.16	0.0888
LSA 40 S4	201.5	480.2	32.07	0.0956
LSA 40 M5	211.5	500.2	35.10	0.1054

NOTE : Dimensions are for information only and may be subject to modifications. Contractual 2D drawings can be downloaded from the Leroy-Somer site, 3D drawing files are available upon request.
The torsional analysis of the transmission is imperative. All values are available upon request.

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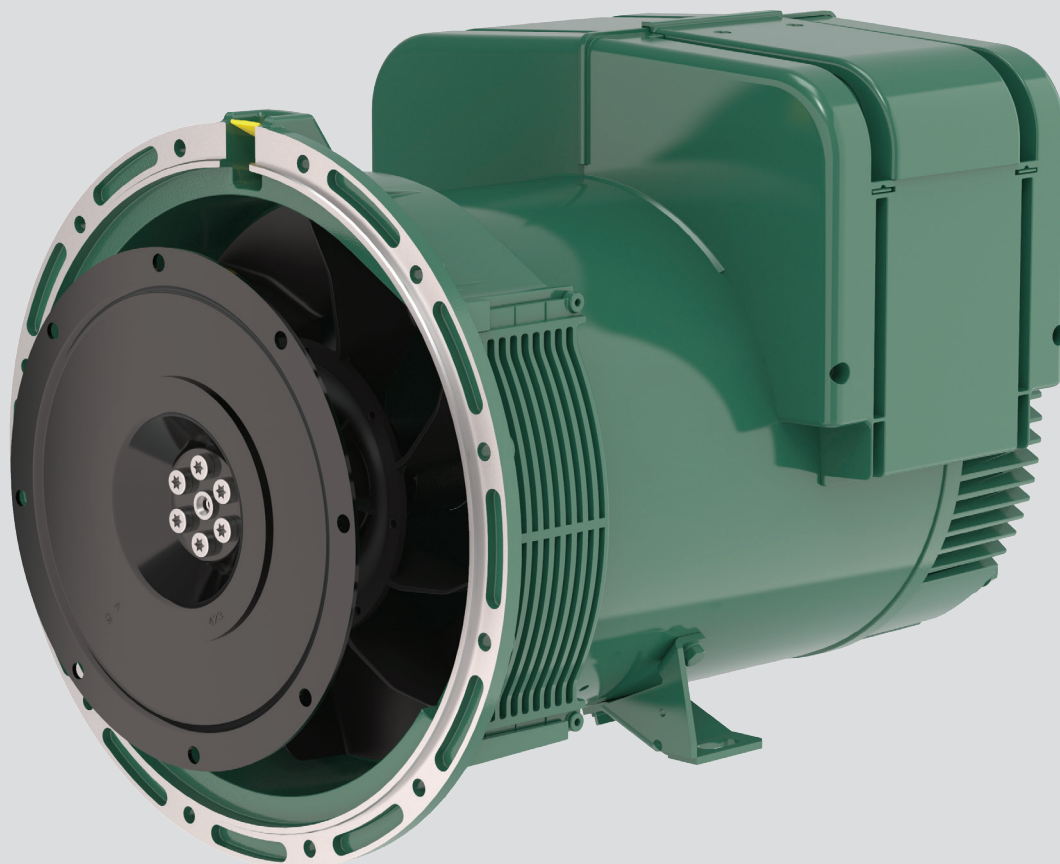
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Nidec
All for dreams

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Moteurs Leroy-Somer SAS. Siège : Bd Marcellin Leroy, CS 10015, 16915 Angoulême Cedex 9, France.
Capital social : 38 679 664 €, RCS Angoulême 338 567 258.



LSA 42.3

Low Voltage Alternator - 4 pole

25 to 60 kVA - 50 Hz / 31.5 to 75 kVA - 60 Hz

Electrical and mechanical data

LEROY-SOMER™

Nidec
All for dreams

The best of performance

Nidec Leroy-Somer LSA 42.3 alternator has been designed to offer you the best power generation performances. With its meticulous design and optimized architecture, the LSA 42.3 strikes the perfect balance between compactness, reliability, performance and longevity.

Whatever your application, the LSA 42.3 will meet your needs and will adapt to all situations.

Standards

Nidec Leroy-Somer LSA 42.3 alternator meets all key international standards and regulations, including IEC 60034, NEMA MG 1.32-33, ISO 8528-3, CSA C22.2 n°100-14 and UL 1446 (UL 1004 on request). Also compliant with IEC 61000-6-2, IEC 61000-6-3, IEC 61000-6-4, VDE 0875G, VDE 0875N and EN 55011, group 1 class A for European zone. Nidec Leroy-Somer LSA 42.3 alternator can be integrated in EC marked generator set, and bears EC, EAC and CMIM markings. It is designed, manufactured and marketed in an ISO 9001 and ISO 14001 quality assurance environment.

Electrical characteristics and performances

- Class H insulation
- 2/3 pitch winding, standard 12-wire (6) reconnectable
- Voltage range:
 - 50 Hz: 220V - 240V and 380V - 415V (440V)
 - 60 Hz: 208V - 240V and 380V - 480V
- High efficiency and motor starting capacity
- Other voltages are possible with optional adapted windings:
 - 50 Hz: 440V (no. 7), 500V (no. 9), 550V (no. 22), 600V (no. 23), 690V (no. 10)
 - 60 Hz: 380V and 416V (no. 8), 600V (no. 9), 690V (no. 22)

Excitation and regulation system

Excitation system				Regulation options		
AVR	SHUNT	AREP (option)	PMG (option)	C.T. Current transformer for paralleling	Mains paralleling	Remote voltage potentiometer
R220	Standard					
D350	Option	Standard	Standard	√*		√
D550**	Option	Option	Option	√*	√	√

*: only with AREP or PMG

** : steel terminal box mounting only

3-phase sensing is included as a standard with digital regulators.

Protection system and options

- The LSA 42.3 is IP 23
- Complete winding protection for clean environments with relative humidity $\leq 95\%$, including indoor marine environments
- Options:
 - Filters on air inlet: derating 5%
 - Filters on air inlet and air outlet (IP 44): derating 10%
 - Reinforced winding protection for harsh environments and relative humidity greater than 95%
 - Space heater
 - Thermal protection for stator windings
 - Shaft height: H = 225 mm (to be specified when ordering)

Mechanical construction

- Compact rigid assembly to better withstand generator vibrations
- Steel frame and terminal box
- Aluminum flanges and shields
- Two-bearing and single-bearing versions designed to be suitable for commercially-available heat engines
- Half-key balancing two-bearing
- Greased for life bearings (20 000h)
- Direction of rotation: clockwise and anti-clockwise (without derating)

Terminal box design

- Easy access to the voltage regulator (lid) and to the connections
- 8-way terminal block for reconnecting the voltage
- Predrilled holes for cable gland



LSA 42.3 - 25 to 60 kVA - 50 Hz / 31.5 to 75 kVA - 60 Hz

General characteristics

Insulation class	H	Excitation system	SHUNT	AREP / PMG
Winding pitch	2/3 (wind. 6)	AVR type	R220	D350
Number of wires	12	Voltage regulation (*)	± 0.5%	± 0.25%
Protection	IP 23	Short-circuit current	-	300% (3 IN): 10 s
Altitude	≤ 1000 m	Total Harmonic Distortion THD (**) in no-load	< 2%	
Overspeed	2250 R.P.M.	Total Harmonic Distortion THD (**) on linear load :	< 4%	
Air flow	0.10 m³/s (50 Hz) - 0.13 m³/s (60 Hz)	Waveform: NEMA = TIF (**)	< 50	

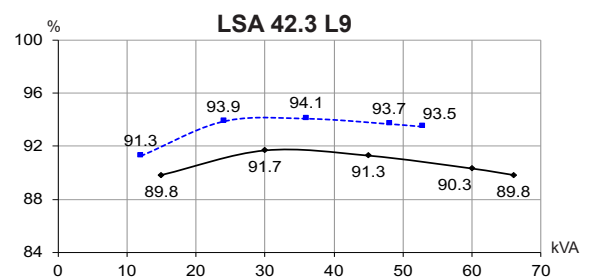
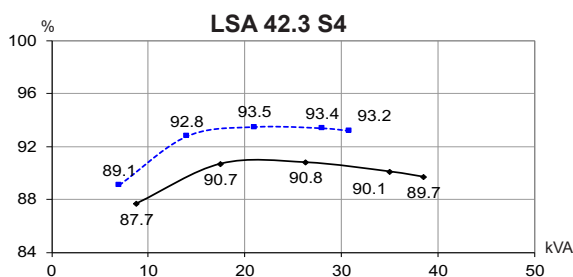
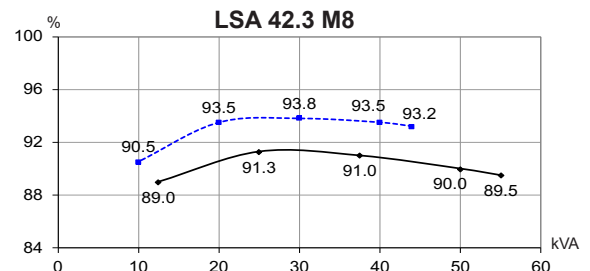
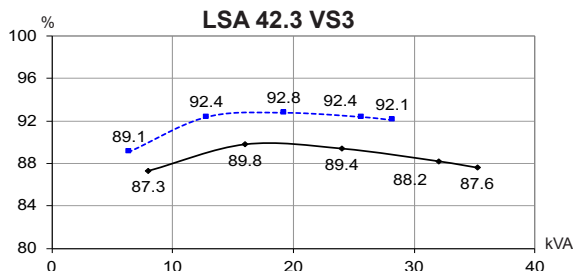
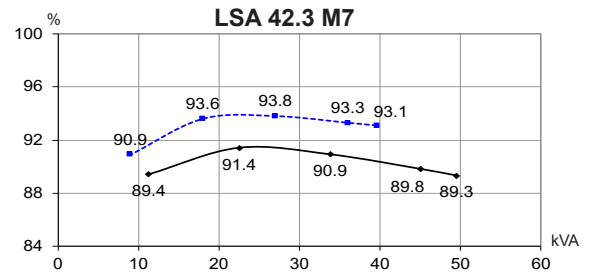
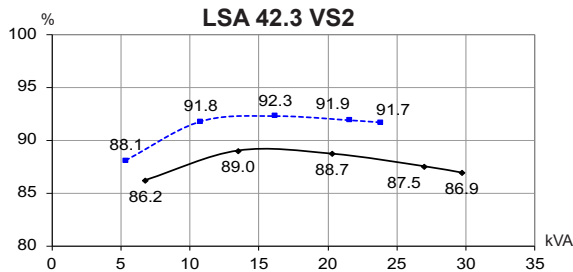
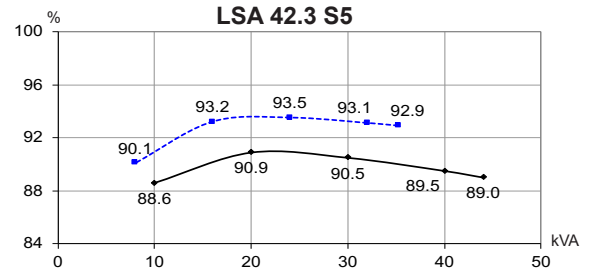
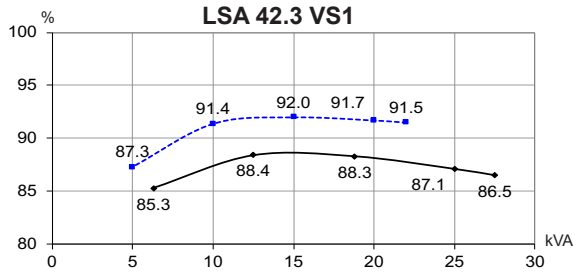
(*) Steady state (**) Total harmonic distortion between phases, no-load or on-load (non-distorting)

Ratings 50 Hz - 1500 R.P.M.

kVA / kW - P.F. = 0.8																					
Duty/T°C		Continuous duty/40°C					Continuous duty/40°C					Stand-by/40°C					Stand-by/27°C				
Class/T°K		H/125°K					F/105°K					H/150°K					H/163°K				
Phase		3 ph.			1 ph.	3 ph.			1 ph.	3 ph.			1 ph.	3 ph.			1 ph.				
Y		380V	400V	415V	440V	ΔΔ	380V	400V	415V	440V	ΔΔ	380V	400V	415V	440V	ΔΔ	380V	400V	415V	440V	ΔΔ
Δ		220V	230V	240V		230V	220V	230V	240V		230V	220V	230V	240V		230V	220V	230V	240V		230V
YY		200V			220V	200V			220V	200V			220V	200V			220V				
LSA 42.3 VS1	kVA	25	25	25	24.5	15	23	23	23	22.5	13.5	26.5	26.5	26.5	26	16	27.5	27.5	27.5	27	16.5
	kW	20	20	20	19.5	12	18.5	18.5	18.5	18	11	21	21	21	21	13	22	22	22	21.5	13
LSA 42.3 VS2	kVA	27	27	27	26	16	24.5	24.5	24.5	23.5	14.5	28.5	28.5	28.5	27.5	17	30	30	30	28.5	17.5
	kW	21.5	21.5	21.5	21	13	19.5	19.5	19.5	19	11.5	23	23	23	22	13.5	24	24	24	23	14
LSA 42.3 VS3	kVA	32	32	32	30	19	29	29	29	27.5	17.5	34	34	34	32	20	35	35	35	33	21
	kW	25.5	25.5	25.5	24	15	23	23	23	22	14	27	27	27	25.5	16	28	28	28	26.5	17
LSA 42.3 S4	kVA	35	35	35	30.5	22	32	32	32	28	20	37	37	37	32.5	23.5	38.5	38.5	38.5	33.5	24
	kW	28	28	28	24.5	17.5	25.5	25.5	25.5	22.5	16	29.5	29.5	29.5	26	19	31	31	31	27	19
LSA 42.3 S5	kVA	40	40	40	35	25	36.5	36.5	36.5	32	23	42.5	42.5	42.5	37	26.5	45	45	45	38.5	27.5
	kW	32	32	32	28	20	29	29	29	25.5	18.5	34	34	34	29.5	21	36	36	36	31	22
LSA 42.3 M7	kVA	45	45	45	39	27	41	41	41	35.5	24.5	48	48	48	41.5	28.5	50	50	50	43	29.5
	kW	36	36	36	31	21.5	33	33	33	28.5	19.5	38.5	38.5	38.5	33	23	40	40	40	34.5	23.5
LSA 42.3 M8	kVA	50	50	50	43	30	45.5	45.5	45.5	39	27.5	53	53	53	45.5	32	55	55	55	47.5	33
	kW	40	40	40	34.5	24	36.5	36.5	36.5	31	22	42	42	42	36.5	25.5	44	44	44	38	26.5
LSA 42.3 L9	kVA	60	60	60	52	36	55	55	55	47.5	33	64	64	64	55	38	66	66	66	57	39.5
	kW	48	48	48	42	29	44	44	44	38	26.5	51	51	51	44	30.5	53	53	53	46	31.5

Ratings 60 Hz - 1800 R.P.M.

kVA / kW - P.F. = 0.8																						
Duty/T°C		Continuous duty/40°C					Continuous duty/40°C					Stand-by/40°C					Stand-by/27°C					
Class/T°K		H/125°K					F/105°K					H/150°K					H/163°K					
Phase		3 ph.			1 ph.	3 ph.			1 ph.	3 ph.			1 ph.	3 ph.			1 ph.					
Y		380V	416V	440V	480V	ΔΔ	380V	416V	440V	480V	ΔΔ	380V	416V	440V	480V	ΔΔ	380V	416V	440V	480V	ΔΔ	
Δ		220V	240V			240V	220V	240V			240V	220V	240V			240V	220V	240V			240V	
YY		208V	220V	240V			208V	220V	240V			208V	220V	240V			208V	220V	240V			
LSA 42.3 VS1		kVA	29	31.5	31.5	31.5	18.9	26.5	28.5	28.5	28.5	17	30.5	33.5	33.5	33.5	20	32	34.5	34.5	34.5	20.8
		kW	23	25	25	25	15	21	23	23	23	13.5	24.5	27	27	27	16	25.5	27.5	27.5	27.5	16.5
LSA 42.3 VS2		kVA	30	32	34	34	19.2	27.5	29	31	31	17.5	32	34	36	36	20.5	33	35	37.5	37.5	21.1
		kW	24	25.5	27	27	15.5	22	23	25	25	14	25.5	27	29	29	16.5	26.5	28	30	30	17
LSA 42.3 VS3		kVA	34.5	38	40	40	23	31.5	34.5	36.5	36.5	21	36.5	40.5	42.5	42.5	24.5	38	42	44	44	25.5
		kW	27.5	30.5	32	32	18.5	25	27.5	29	29	17	29	32.5	34	34	19.5	30.5	33.5	35	35	20.5
LSA 42.3 S4		kVA	37.5	40.5	43	44	24	34	37	39	40	22	40	43	45.5	46.5	25.5	41.5	44.5	47.5	48.5	26.5
		kW	30	32.5	34.5	35	19	27	29.5	31	32	17.5	32	34.5	36.5	37	20.5	33	35.5	38	39	21
LSA 42.3 S5		kVA	42	46	49	50	27.5	38	42	44.5	45.5	25	44.5	49	52	53	29	46	51	54	55	30.5
		kW	33.5	37	39	40	22	30.5	33.5	35.5	36.5	20	35.5	39	42	42	23	37	41	43	44	24.5
LSA 42.3 M7		kVA	46	50	53.5	56.5	30	42	45.5	48.5	51	27.5	49	53	57	60	32	51	55	59	62.5	33
		kW	37	40	43	45	24	33.5	36.5	39	41	22	39	42	46	48	25.5	41	44	47	50	26.5
LSA 42.3 M8		kVA	51.5	56.5	59.5	62.5	34	47	51	54	57	31	55	60	63	66.5	36	57	62.5	65.5	69	37.5
		kW	41	45	48	50	27	37.5	41	43	46	25	44	48	50	53	29	46	50	52	55	30
LSA 42.3 L9		kVA	59	65	69	75	39	54	59	63	68	35.5	63	69	73	80	41.5	65	72	76	82.5	43
		kW	47	52	55	60	31	43	47	50	54	28.5	50	55	58	64	33	52	58	61	66	34.5

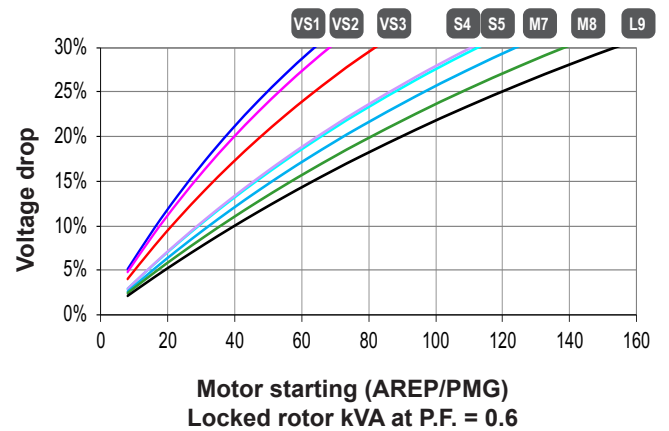
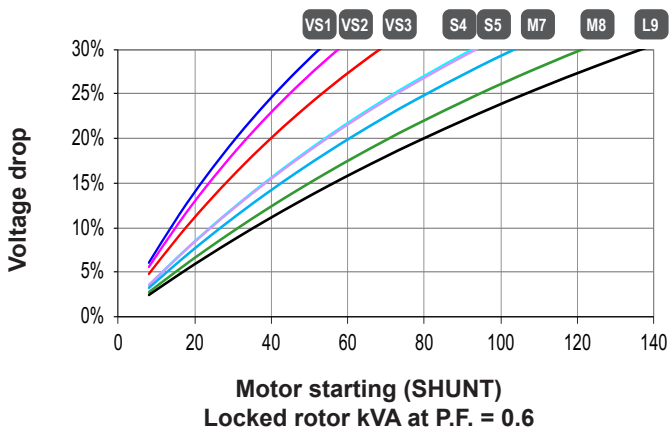
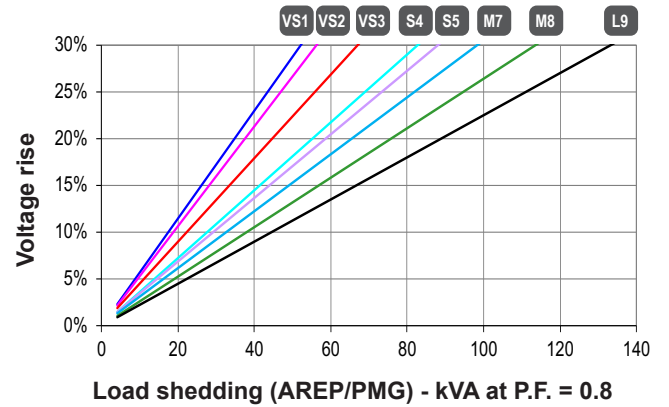
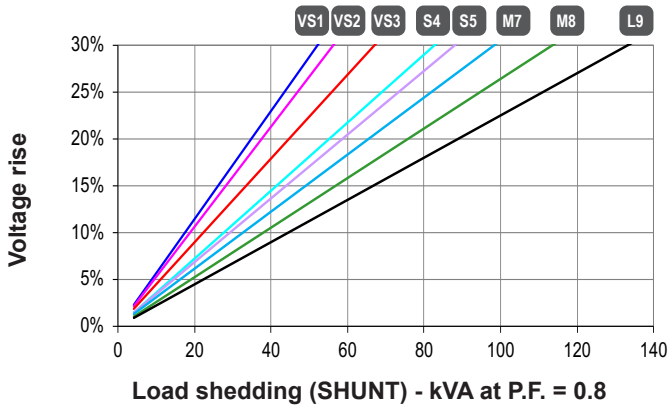
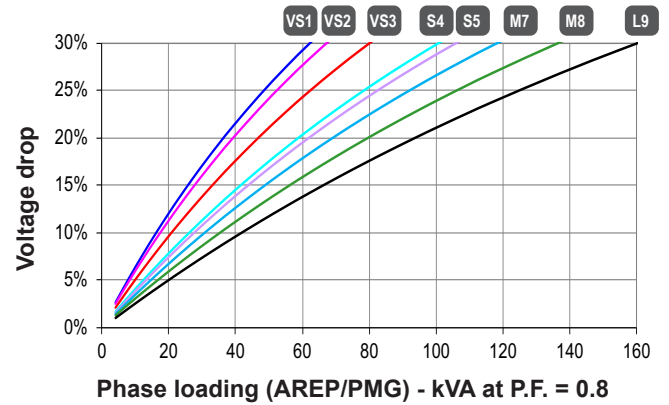
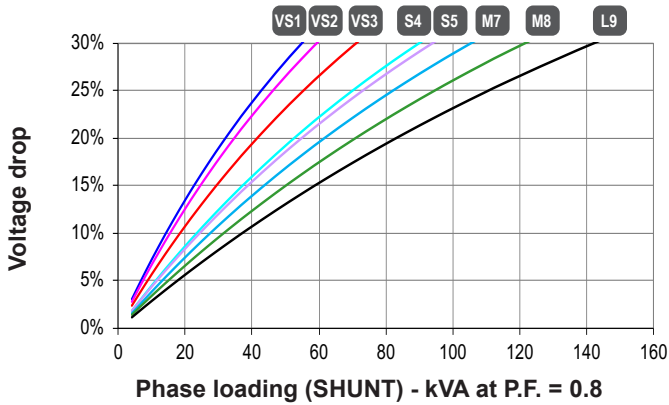
Efficiencies 400 V - 50 Hz (— P.F.: 0.8) (..... P.F.: 1)

Reactances (%). Time constants (ms) - Class H / 400 V

	VS1	VS2	VS3	S4	S5	M7	M8	L9
Kcc Short-circuit ratio	0.54	0.51	0.48	0.53	0.46	0.43	0.47	0.44
Xd Direct-axis synchronous reactance unsaturated	240	249	261	229	262	275	264	283
Xq Quadrature-axis synchronous reactance unsaturated	122	127	133	117	133	140	134	144
T'do No-load transient time constant	733	759	803	880	880	914	931	962
X'd Direct-axis transient reactance saturated	16.3	16.4	16.2	13	14.8	15	14.1	14.7
T'd Short-circuit transient time constant	50	50	50	50	50	50	50	50
X''d Direct-axis subtransient reactance saturated	8.1	8.2	8.1	6.5	7.4	7.5	7.0	7.3
T''d Subtransient time constant	5	5	5	5	5	5	5	5
X''q Quadrature-axis subtransient reactance saturated	11.5	11.6	11.5	9.2	10.6	10.7	10.1	10.5
Xo Zero sequence reactance	0.68	0.68	0.67	0.54	0.62	0.62	0.59	0.61
X2 Negative sequence reactance saturated	9.88	9.91	9.82	7.89	9.02	9.12	8.61	8.93
Ta Armature time constant	8	8	8	8	8	8	8	8

Other class H/400 V data

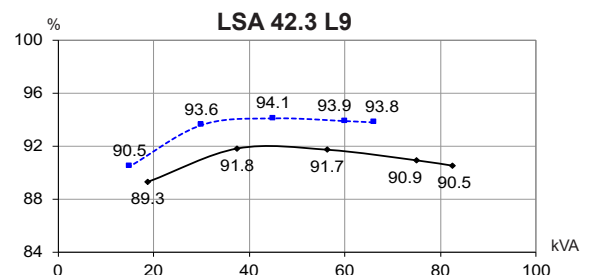
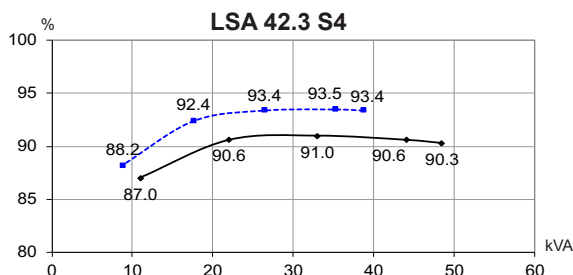
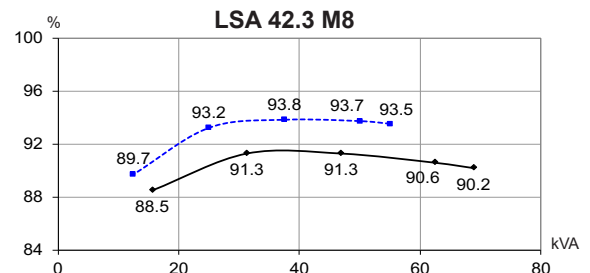
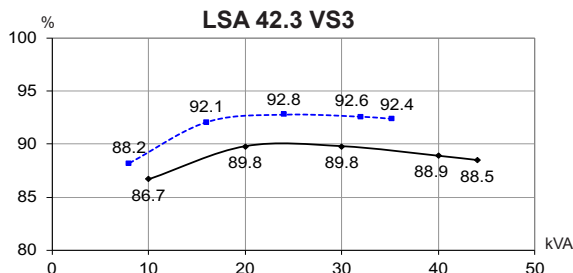
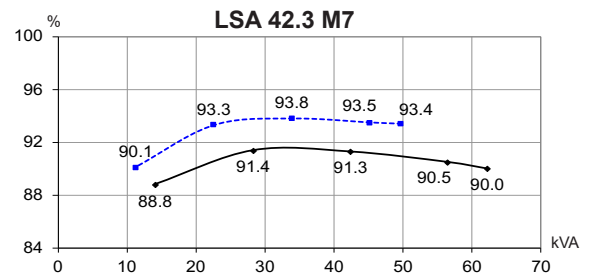
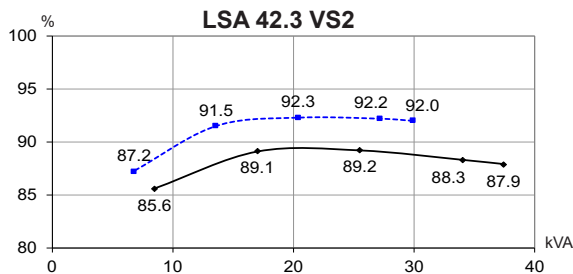
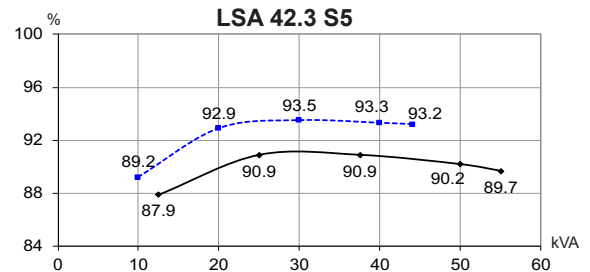
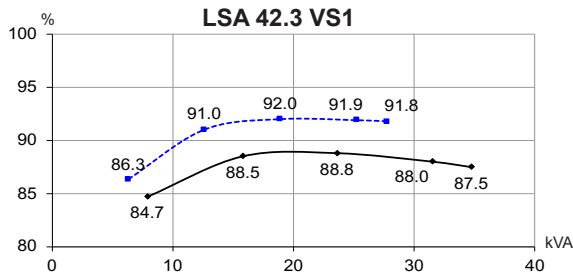
io (A) No-load excitation current (SHUNT/AREP)	0.55/0.85	0.52/0.8	0.51/0.79	0.49/0.75	0.49/0.75	0.46/0.71	0.5/0.78	0.5/0.77
ic (A) On-load excitation current (SHUNT/AREP)	1.77/2.72	1.75/2.68	1.8/2.76	1.55/2.38	1.76/2.7	1.77/2.71	1.9/2.91	2.07/3.18
uc (V) On-load excitation voltage (SHUNT/AREP)	30.2/19.3	29.8/19	30.4/19.5	26.2/16.8	29.4/18.8	29.4/18.8	31.1/19.9	33.3/21.3
ms Response time ($\Delta U = 20\%$ transient)	500	500	500	500	500	500	500	500
kVA Start ($\Delta U = 20\%$ cont. or ($\Delta U = 30\%$ trans.) SHUNT	53	57	68	93	93	104	122	137
kVA Start ($\Delta U = 20\%$ cont. or ($\Delta U = 30\%$ trans.) AREP	64	68	82	112	111	124	138	154
% Transient ΔU (on-load 4/4) SHUNT - P.F.: 0.8 _{LAG}	16.3	16.3	16.2	14.3	15.4	15.5	15	15.3
% Transient ΔU (on-load 4/4) AREP - P.F.: 0.8 _{LAG}	14.7	14.7	14.6	13	14	14	13.6	13.9
W No-load losses	719	713	762	861	861	879	1029	1120
W Heat dissipation	2938	3058	3414	3072	3736	4050	4438	5134

Transient voltage variation 400V - 50 Hz



- 1) For a starting P.F. other than 0.6, the starting kVA must be multiplied by $K = \text{Sine P.F.} / 0.6$
- 2) For voltages other than 400V (Y), 230V (Δ) at 50 Hz, then kVA must be multiplied by $(400/U)^2$ or $(230/U)^2$.

Efficiencies 480 V - 60 Hz (— P.F.: 0.8) (..... P.F.: 1)



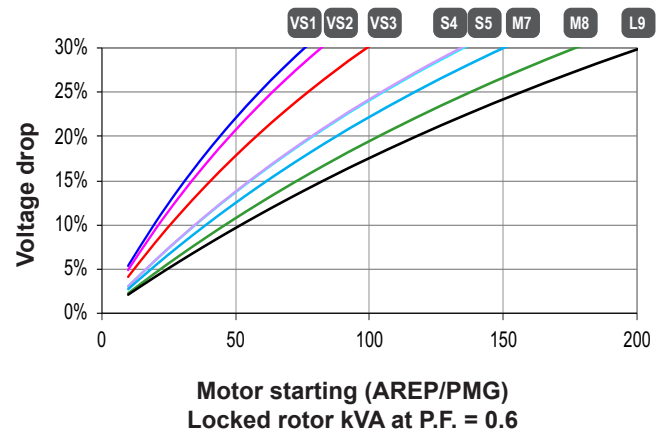
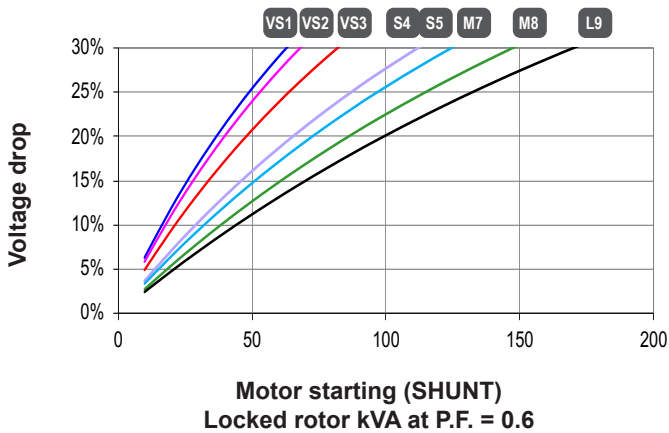
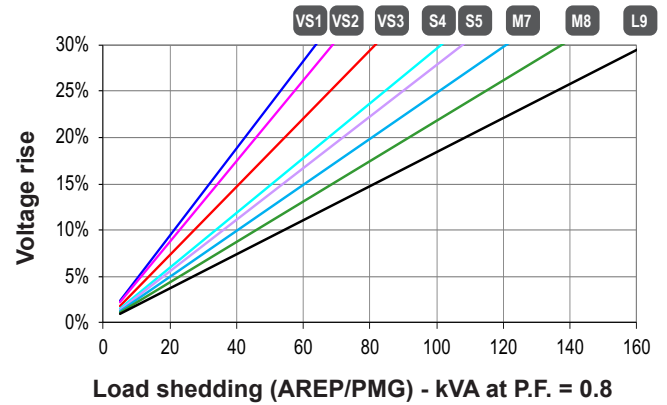
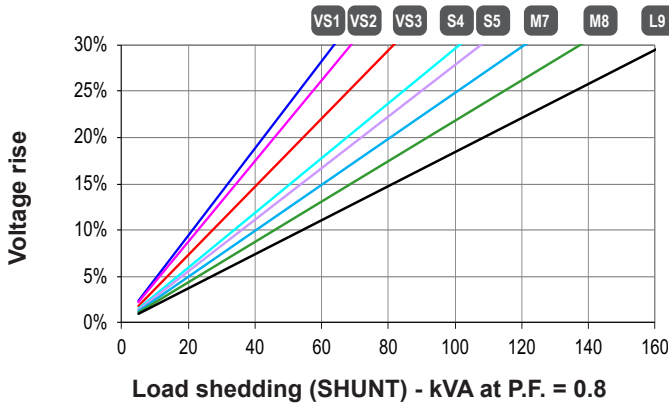
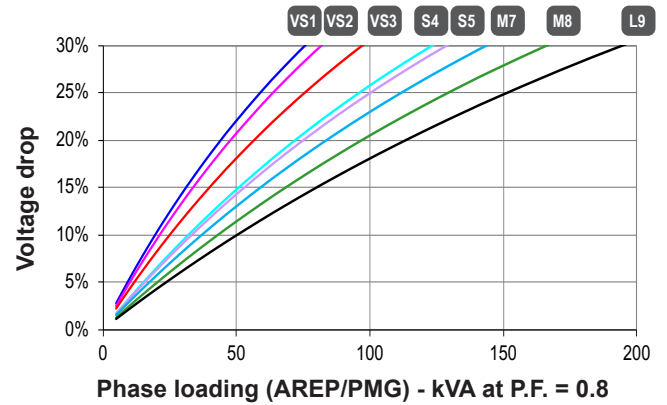
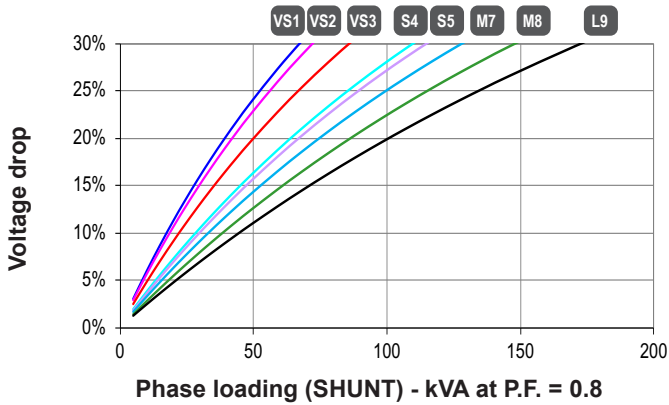
Reactances (%). Time constants (ms) - Class H / 480 V

		VS1	VS2	VS3	S4	S5	M7	M8	L9
Kcc	Short-circuit ratio	0.52	0.48	0.46	0.51	0.44	0.41	0.45	0.42
Xd	Direct-axis synchronous reactance unsaturated	252	261	272	240	273	287	275	294
Xq	Quadrature-axis synchronous reactance unsaturated	128	133	138	122	139	146	140	150
T'do	No-load transient time constant	733	759	803	880	880	914	931	962
X'd	Direct-axis transient reactance saturated	17.2	17.2	16.9	13.6	15.5	15.7	14.7	15.3
T'd	Short-circuit transient time constant	50	50	50	50	50	50	50	50
X''d	Direct-axis subtransient reactance saturated	8.6	8.6	8.4	6.8	7.7	7.8	7.3	7.6
T''d	Subtransient time constant	5	5	5	5	5	5	5	5
X''q	Quadrature-axis subtransient reactance saturated	12.1	12.1	12	9.7	11	11.2	10.5	10.9
Xo	Zero sequence reactance	0.71	0.71	0.7	0.56	0.64	0.65	0.61	0.63
X2	Negative sequence reactance saturated	10.37	10.4	10.24	8.27	9.39	9.55	8.97	9.3
Ta	Armature time constant	8	8	8	8	8	8	8	8

Other class H/480 V data

io (A)	No-load excitation current (SHUNT/AREP)	0.55/0.85	0.52/0.8	0.51/0.79	0.49/0.75	0.49/0.75	0.46/0.71	0.5/0.77	0.5/0.77
ic (A)	On-load excitation current (SHUNT/AREP)	1.79/2.74	1.76/2.71	1.8/2.76	1.56/2.39	1.75/2.69	1.77/2.71	1.87/2.87	2.02/3.1
uc (V)	On-load excitation voltage (SHUNT/AREP)	30.8/19.7	30.3/19.4	30.8/19.7	26.7/17.1	29.8/19	29.8/19.1	31.3/20	33.3/21.3
ms	Response time ($\Delta U = 20\%$ transient)	500	500	500	500	500	500	500	500
kVA	Start ($\Delta U = 20\%$ cont. or ($\Delta U = 30\%$ trans.) SHUNT	63	68	82	112	112	125	147	170
kVA	Start ($\Delta U = 20\%$ cont. or ($\Delta U = 30\%$ trans.) AREP	76	82	99	135	134	150	177	202
%	Transient ΔU (on-load 4/4) SHUNT - P.F.: 0.8 _{LAG}	16.8	16.8	16.6	14.7	15.8	15.9	15.4	15.7
%	Transient ΔU (on-load 4/4) AREP - P.F.: 0.8 _{LAG}	15.1	15.1	15	13.3	14.3	14.4	13.9	14.2
W	No-load losses	1021	1016	1087	1229	1229	1258	1462	1590
W	Heat dissipation	3431	3568	3954	3640	4343	4737	5160	5960

Transient voltage variation 480V - 60 Hz

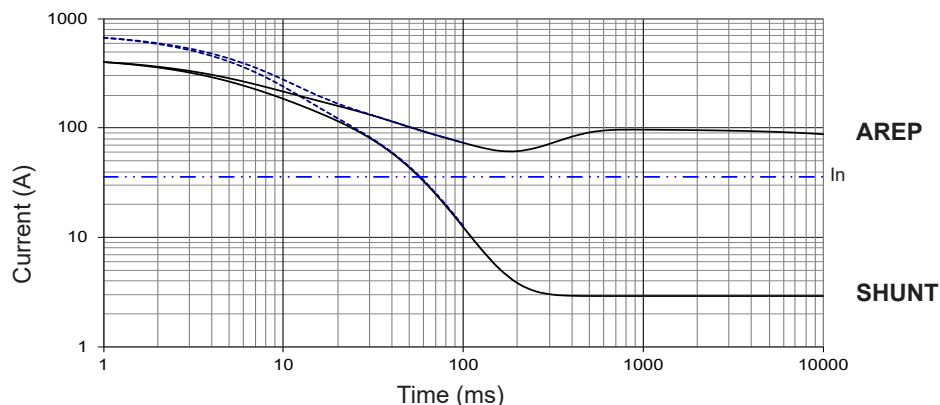


- 1) For a starting P.F. other than 0.6, the starting kVA must be multiplied by $K = \text{Sine P.F.} / 0.6$
- 2) For voltages other than 480V (Y), 277V (Δ), 240V (YY) at 60 Hz, then kVA must be multiplied by $(480/U)^2$ or $(277/U)^2$ or $(240/U)^2$.

3-phase short-circuit curves at no load and rated speed (star connection Y)

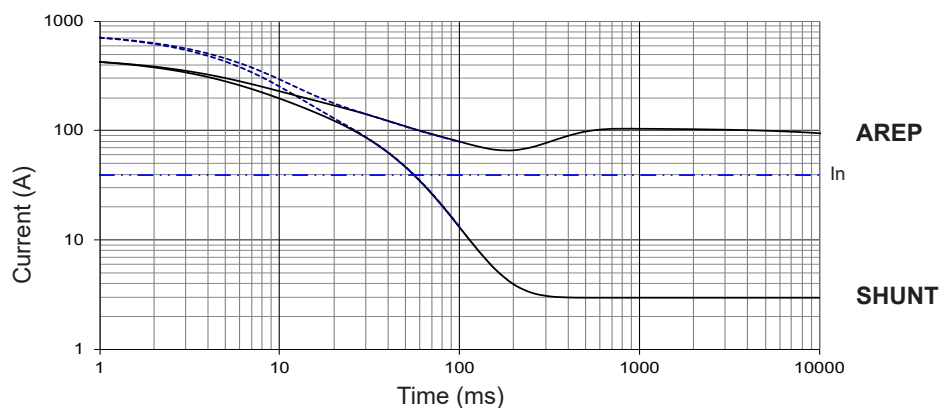
LSA 42.3 VS1

Symmetrical —
Asymmetrical - - -



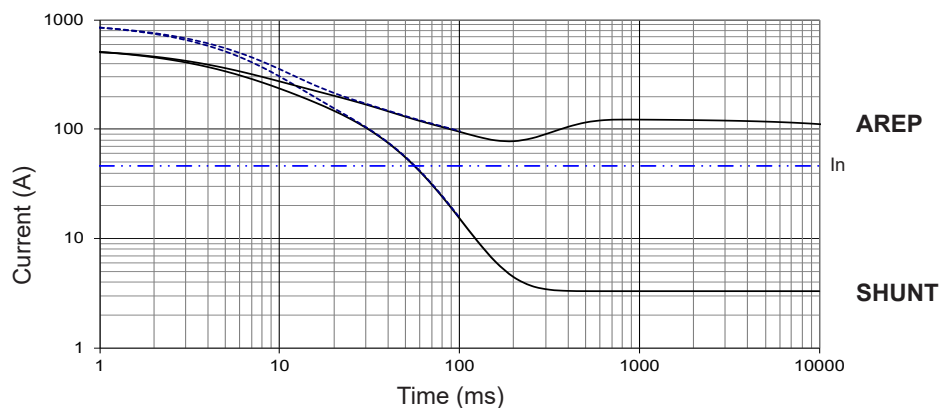
LSA 42.3 VS2

Symmetrical —
Asymmetrical - - -



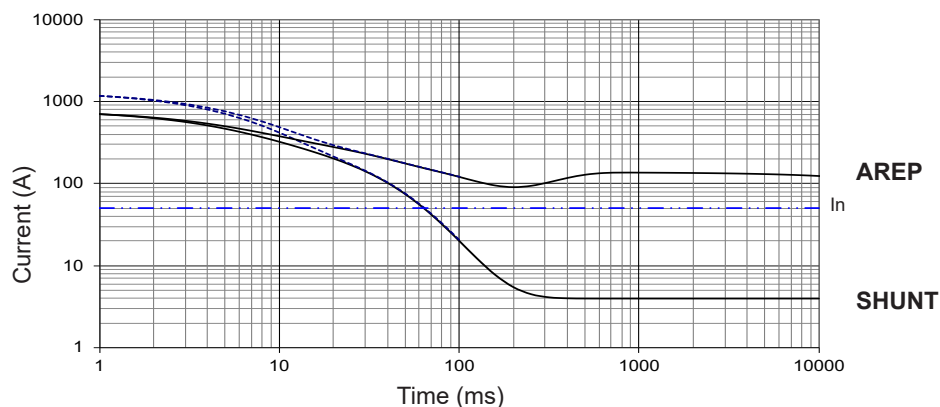
LSA 42.3 VS3

Symmetrical —
Asymmetrical - - -



LSA 42.3 S4

Symmetrical —
Asymmetrical - - -



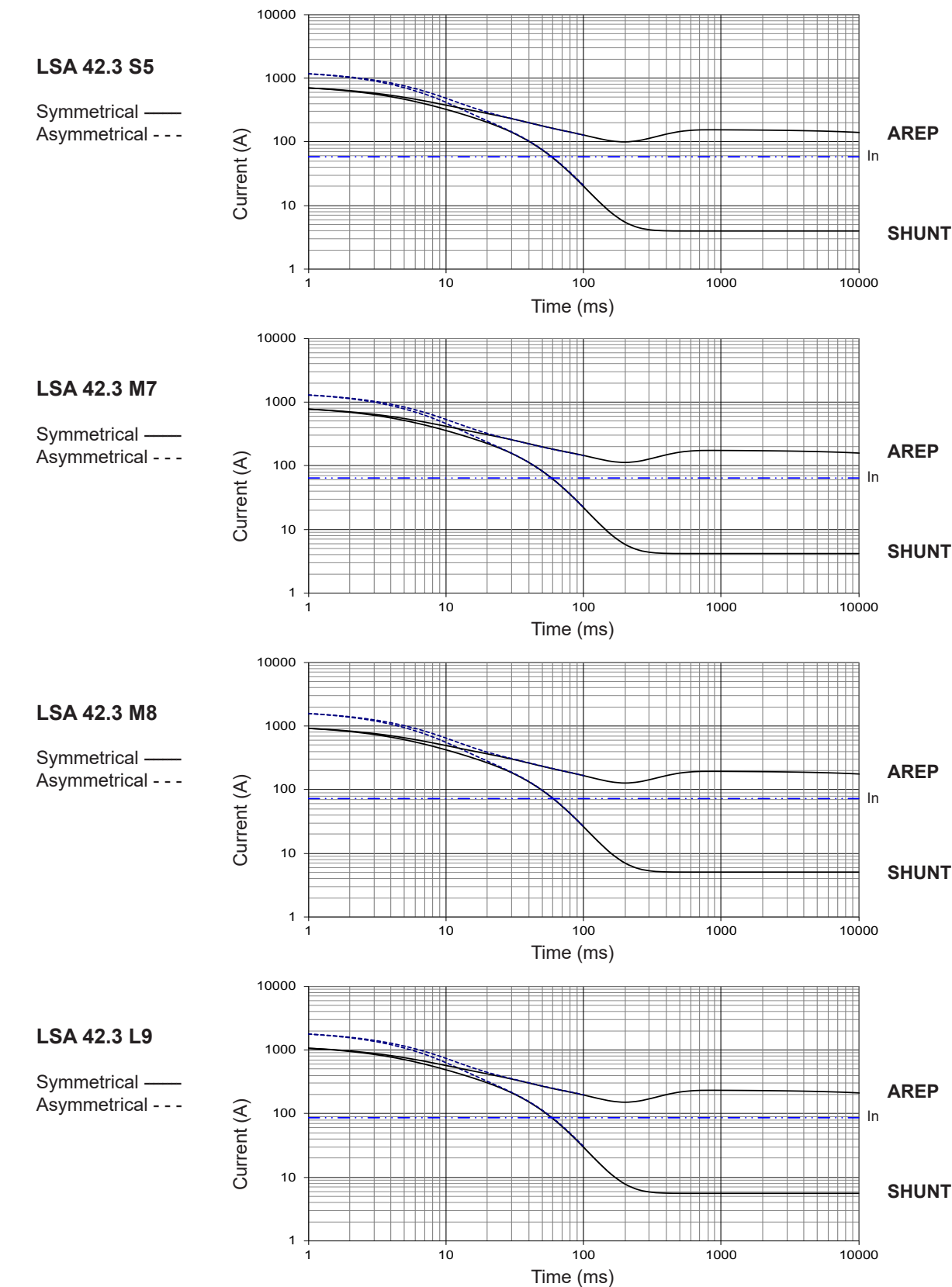
Influence due to connection

Curves shown are for star (Y) connection.

For other connections, use the following multiplication factors:

- Series delta : current value x 1.732 - Parallel star : current value x 2

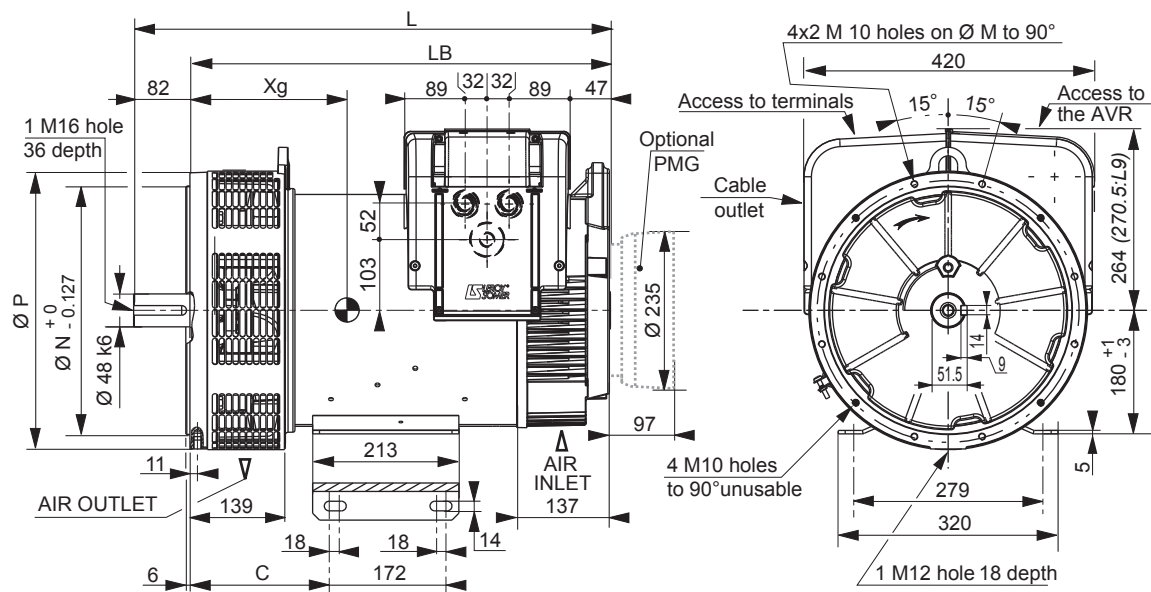
3-phase short-circuit curves at no load and rated speed (star connection Y)



Influence due to short-circuit
Curves are based on a three-phase short-circuit.
For other types of short-circuit, use the following multiplication factors.

	3-phase	2-phase L/L	1-phase L/N
Instantaneous (max.)	1	0.87	1.3
Continuous	1	1.5	2.2
Maximum duration (AREP/PMG)	10 sec.	5 sec.	2 sec.

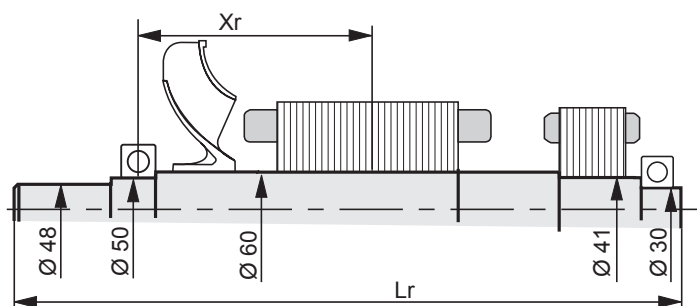
Two-bearing dimensions



Dimensions (mm) and weight

Type	L without PMG	LB	N	M	P	C	Xg	Weight (kg)
LSA 42.3 VS1	610	528	361.95	381	406	189.25	242	129
LSA 42.3 VS2	610	528	361.95	381	406	189.25	247	134
LSA 42.3 VS3	610	528	361.95	381	406	189.25	257	145
LSA 42.3 S4	655	573	361.95	381	406	202.75	280	170
LSA 42.3 S5	655	573	361.95	381	406	202.75	280	170
LSA 42.3 M7	695	613	361.95	381	406	202.75	292	185
LSA 42.3 M8	695	613	361.95	381	406	202.75	300	190
LSA 42.3 L9	725	643	409.58	428.62	455	202.75	314	207

Torsional analysis data



Centre of gravity: Xr (mm), Rotor length: Lr (mm), Weight: M (kg), Moment of inertia: J (kgm²): (4J = MD²)

Type	Xr	Lr	M	J
LSA 42.3 VS1	238	603	45.18	0.2135
LSA 42.3 VS2	240	603	47.18	0.2263
LSA 42.3 VS3	245	603	51.23	0.2518
LSA 42.3 S4	267	648	61.31	0.3096
LSA 42.3 S5	267	648	61.31	0.3096
LSA 42.3 M7	281	688	67.23	0.3417
LSA 42.3 M8	286	688	70.23	0.3609
LSA 42.3 L9	299	718	77.29	0.4066

NOTE : Dimensions are for information only and may be subject to modifications. Contractual 2D drawings can be downloaded from the Leroy-Somer site, 3D drawing files are available upon request.
The torsional analysis of the transmission is imperative. All values are available upon request.

LEROY-SOMERTM

www.leroy-somer.com/epg

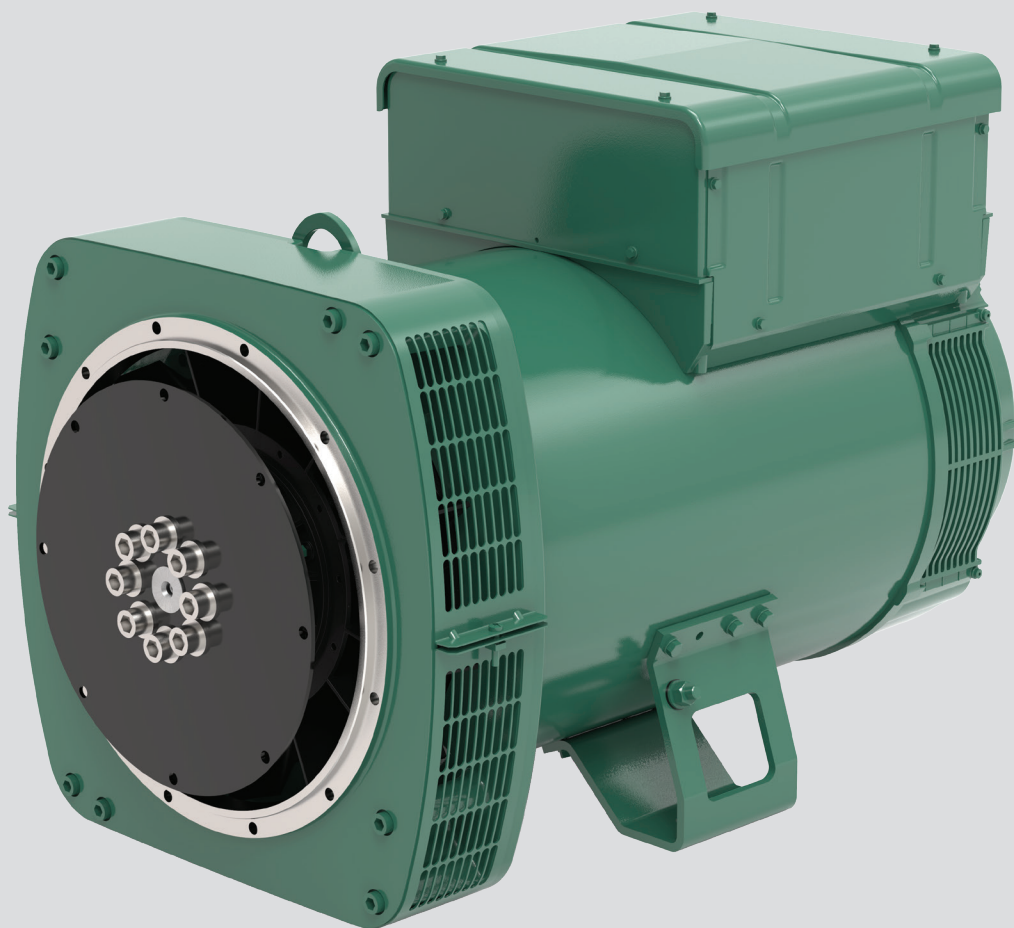
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Nidec
All for dreams

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Moteurs Leroy-Somer SAS. Siège : Bd Marcellin Leroy, CS 10015, 16915 Angoulême Cedex 9, France.
Capital social : 38 679 664 €, RCS Angoulême 338 567 258.



LSA 44.3

Low Voltage Alternator - 4 pole

70 to 200 kVA - 50 Hz / 88 to 250 kVA - 60 Hz

Electrical and mechanical data

LEROY-SOMER™

Nidec
All for dreams

The best of performance

Nidec Leroy-Somer LSA 44.3 alternator has been designed to offer you the best power generation performances. With its meticulous design and optimized architecture, the LSA 44.3 strikes the perfect balance between compactness, reliability, performance and longevity.

Whatever your application, the LSA 44.3 will meet your needs and will adapt to all situations.

Standards

Nidec Leroy-Somer LSA 44.3 alternator meets all key international standards and regulations, including IEC 60034, NEMA MG 1.32-33, ISO 8528-3, CSA C22.2 n°100-14 and UL 1446 (UL 1004 on request). Also compliant with IEC 61000-6-2, IEC 61000-6-3, IEC 61000-6-4, VDE 0875G, VDE 0875N and EN 55011, group 1 class A for European zone. Nidec Leroy-Somer LSA 44.3 alternator can be integrated in EC marked generator set, and bears EC, EAC and CMIM markings. It is designed, manufactured and marketed in an ISO 9001 and ISO 14001 quality assurance environment.

Electrical characteristics and performances

- Class H insulation
- 2/3 pitch winding, standard 12-wire (6) reconnectable
- Voltage range:
 - 50 Hz: 220V - 240V and 380V - 415V (440V)
 - 60 Hz: 208V - 240V and 380V - 480V
- High efficiency and motor starting capacity
- Other voltages are possible with optional adapted windings:
 - 50 Hz: 440V (no. 7), 500V (no. 9), 550V (no. 22), 600V (no. 23), 690V (no. 10 or 52)
 - 60 Hz: 380V and 416V (no. 8), 600V (no. 9), 690V (no. 22)

Excitation and regulation system

Excitation system				Regulation options		
AVR	SHUNT	AREP (option)	PMG (option)	C.T. Current transformer for paralleling	Mains paralleling	Remote voltage potentiometer
R250	Standard					√
D350	Option	Standard	Standard	√*		√
D550	Option	Option	Option	√*	√	√

*: only with AREP or PMG

3-phase sensing is included as a standard with digital regulators.

Protection system and options

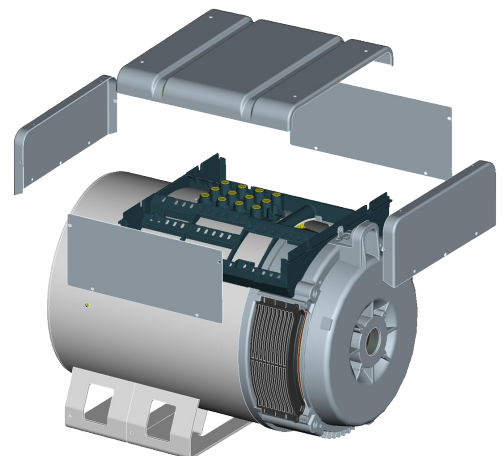
- The LSA 44.3 is IP 23
- Complete winding protection for clean environments with relative humidity $\leq 95\%$, including indoor marine environments
- Options:
 - Filters on air inlet: derating 5%
 - Filters on air inlet and air outlet (IP 44): derating 10%
 - Reinforced winding protection for harsh environments and relative humidity greater than 95%
 - Space heater
 - Thermal protection for stator windings
 - Shaft height: H = 225 mm and 280 mm (to be specified when ordering)
 - Cable outlet at right

Mechanical construction

- Compact rigid assembly to better withstand generator vibrations
- Steel frame and terminal box
- Aluminum/cast iron flanges and shields
- Two-bearing and single-bearing versions designed to be suitable for commercially-available heat engines
- Half-key balancing two-bearing
- Greased for life bearings (20 000h)
- Direction of rotation: clockwise and anti-clockwise (without derating)

Terminal box design

- Easy access to the voltage regulator (lid) and to the connections
- Terminal block for reconnecting the voltage



LSA 44.3 - 70 to 200 kVA - 50 Hz / 88 to 250 kVA - 60 Hz

General characteristics

Insulation class		H	Excitation system		SHUNT	AREP / PMG
Winding pitch		2/3 (wind. 6)	AVR type		R250	D350
Number of wires		12	Voltage regulation (*)		± 0.5%	± 0.25%
Protection		IP 23	Short-circuit current		-	300% (3 IN): 10 s
Altitude		≤ 1000 m	Total Harmonic Distortion THD (**) in no-load: < 2%			
Overspeed		2250 R.P.M.	Total Harmonic Distortion THD (**) on linear load ...: < 5%			
Air flow		0.25m³/s (50 Hz) - 0.30m³/s (60 Hz)	Waveform: NEMA = TIF (**) < 50			
Air flow (***)		0.29m³/s (50 Hz) - 0.34m³/s (60 Hz)	(*) Steady state (**) Total harmonic distortion between phases, no-load or on-load (non-distorting)			
(***) Only for LS 44.3 L12, VL13 & VL14						

Ratings 50 Hz - 1500 R.P.M.

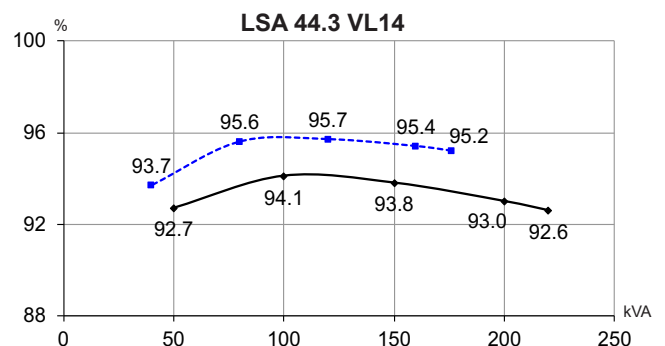
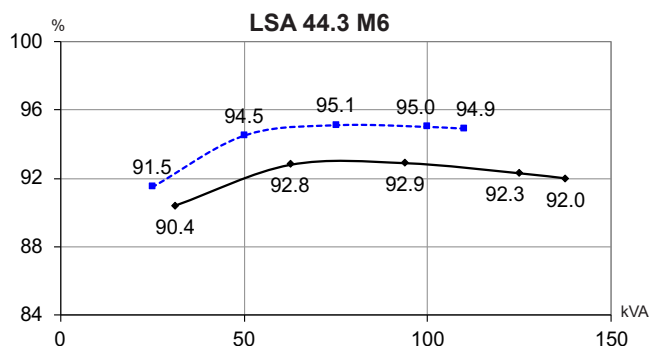
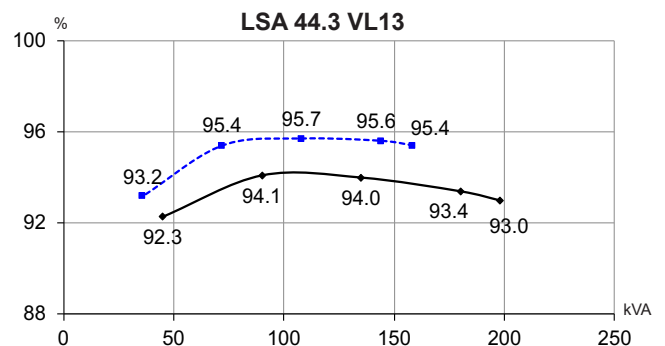
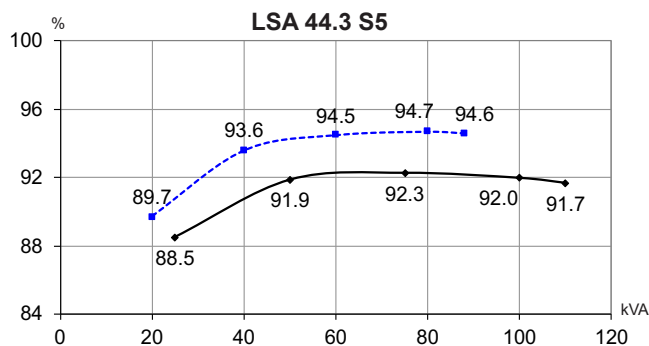
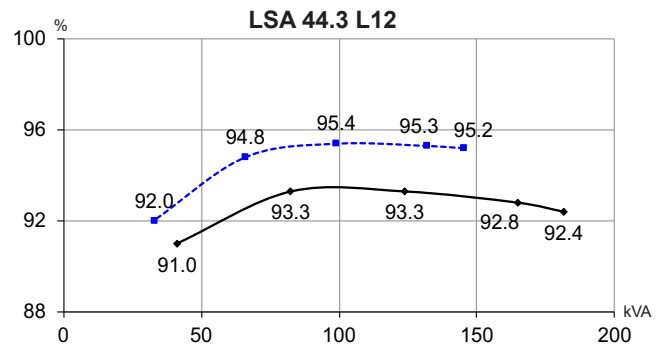
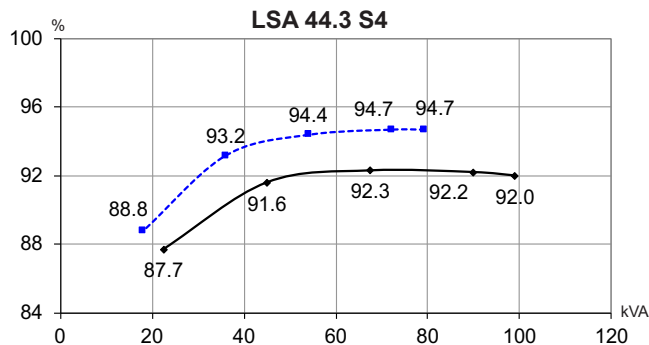
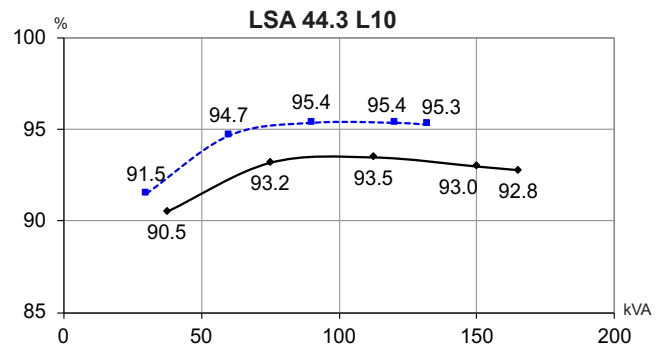
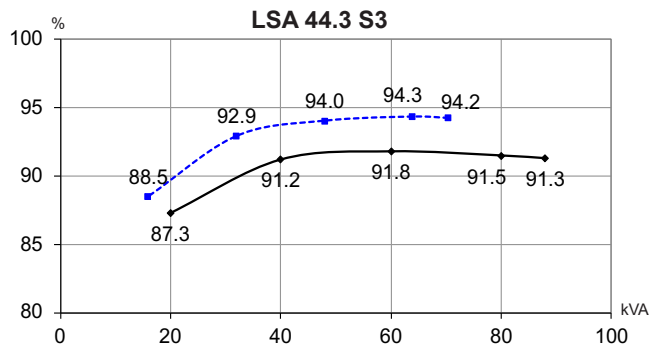
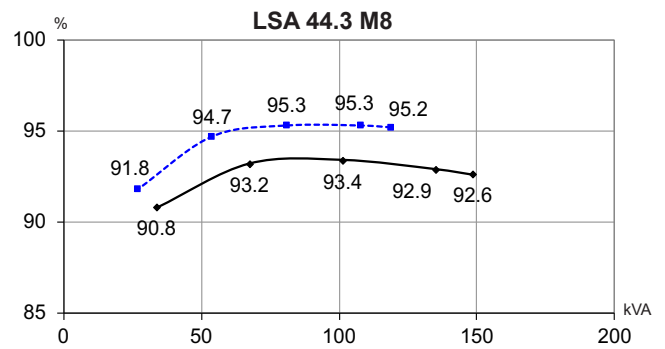
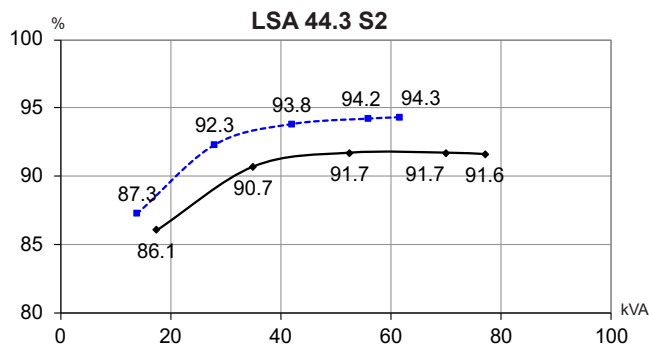
kVA / kW * - P.F. = 0.8																					
Duty/T°C		Continuous duty/40°C					Continuous duty/40°C					Stand-by/40°C					Stand-by/27°C				
Class/T°C		H/125°K					F/105°K					H/150°K					H/163°K				
Phase		3 ph.			1 ph.		3 ph.			1 ph.		3 ph.			1 ph.		3 ph.			1 ph.	
Y		380V	400V	415V	440V	ΔΔ	380V	400V	415V	440V	ΔΔ	380V	400V	415V	440V	ΔΔ	380V	400V	415V	440V	ΔΔ
Δ		220V	230V	240V		230V	220V	230V	240V		230V	220V	230V	240V		230V	220V	230V	240V		230V
YY		200V			220V		200V			220V		200V			220V		200V			220V	
LSA 44.3 S2	kVA	70	70	70	63	42	64	64	64	57	38	74	74	74	67	45	77	77	77	69	46
	kW	56	56	56	50	33.5	51	51	51	46	30.5	59	59	59	54	36	62	62	62	55	37
LSA 44.3 S3	kVA	80	80	80	72	48	73	73	73	66	44	85	85	85	76	51	88	88	88	79	53
	kW	64	64	64	58	38.5	58	58	58	53	35	68	68	68	61	41	70	70	70	63	42
LSA 44.3 S4	kVA	90	90	90	81	54	82	82	82	74	49	95	95	95	86	57	100	100	100	89	59
	kW	72	72	72	65	43	66	66	66	59	39	76	76	76	69	46	80	80	80	71	47
LSA 44.3 S5	kVA	100	100	100	90	60	91	91	91	82	55	106	106	106	95	64	110	110	110	99	66
	kW	80	80	80	72	48	73	73	73	66	44	85	85	85	76	51	88	88	88	79	53
LSA 44.3 M6	kVA	125	125	125	113	67	114	114	114	103	61	133	133	133	120	71	138	138	138	124	74
	kW	100	100	100	90	54	91	91	91	82	49	106	106	106	96	57	110	110	110	99	59
LSA 44.3 M8	kVA	135	135	135	122	73	123	123	123	111	66	143	143	143	129	77	150	150	150	134	80
	kW	108	108	108	98	58	98	98	98	89	53	114	114	114	103	62	120	120	120	107	64
LSA 44.3 L10	kVA	150	150	150	135	80	137	137	137	123	73	159	159	159	143	85	165	165	165	149	88
	kW	120	120	120	108	64	110	110	110	98	58	127	127	127	114	68	132	132	132	119	70
LSA 44.3 L12	kVA	165	165	165	138	88	150	150	150	126	80	175	175	175	150	93	182	182	182	157	97
	kW	132	132	132	110	70	120	120	120	101	64	140	140	140	120	74	146	146	146	126	78
LSA 44.3 VL13	kVA	180	180	180	171	90	164	164	164	156	82	191	191	191	181	95	200	200	200	188	99
	kW	144	144	144	137	72	131	131	131	125	66	153	153	153	145	76	160	160	160	150	79
LSA 44.3 VL14	kVA	192	200	200	192	100	175	182	182	175	91	204	212	212	204	106	211	220	220	211	110
	kW	154	160	160	154	80	140	146	146	140	73	163	170	170	163	85	169	176	176	169	88

Ratings 60 Hz - 1800 R.P.M.

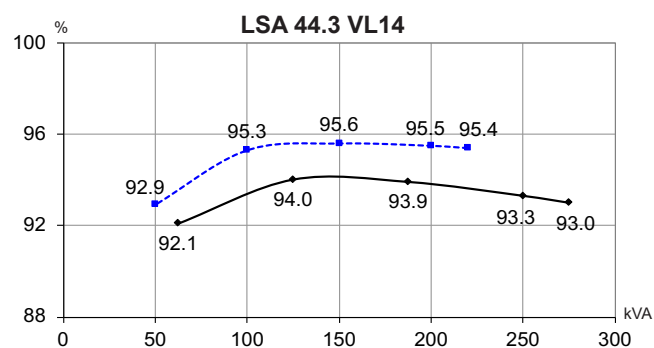
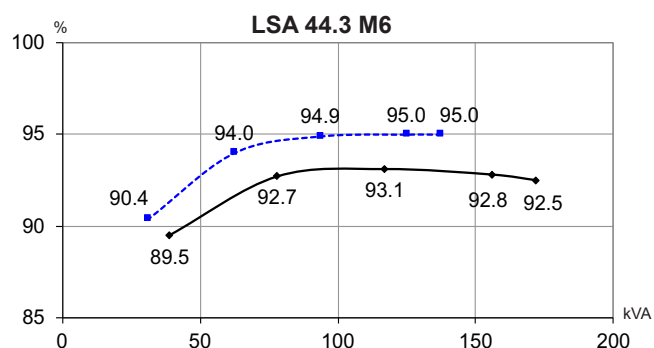
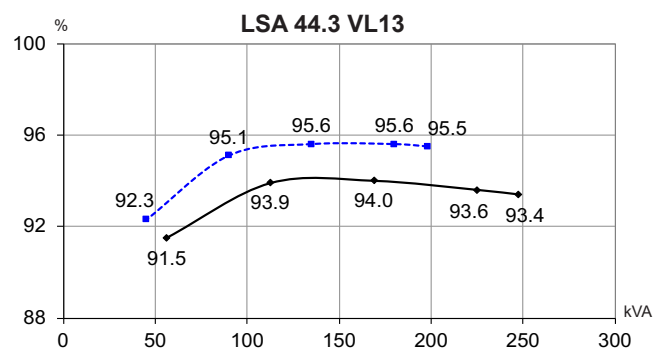
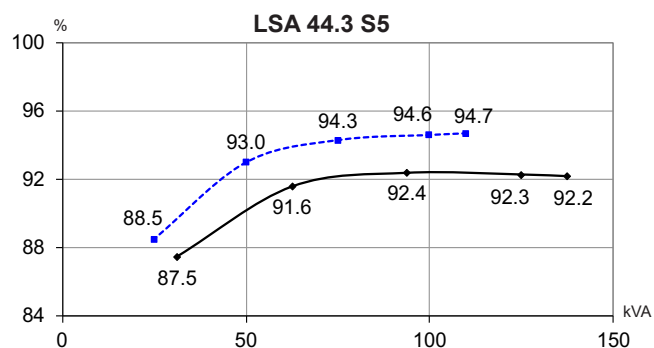
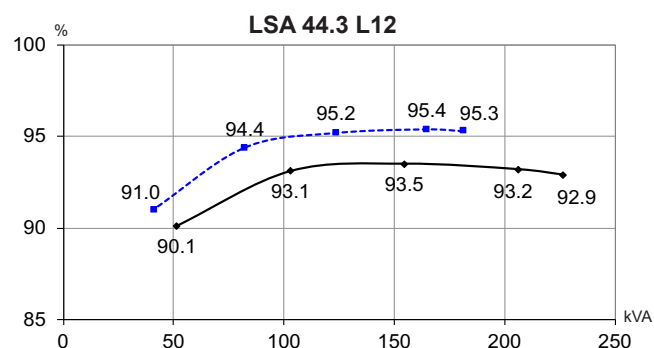
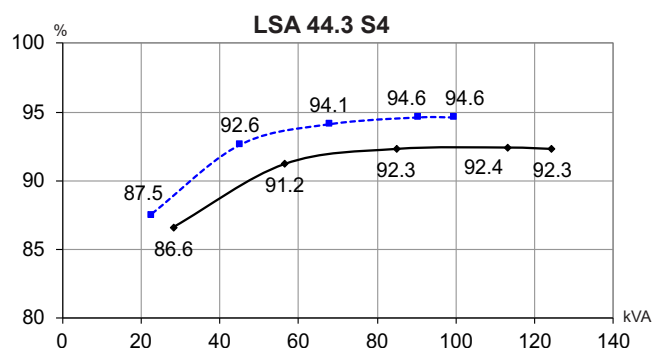
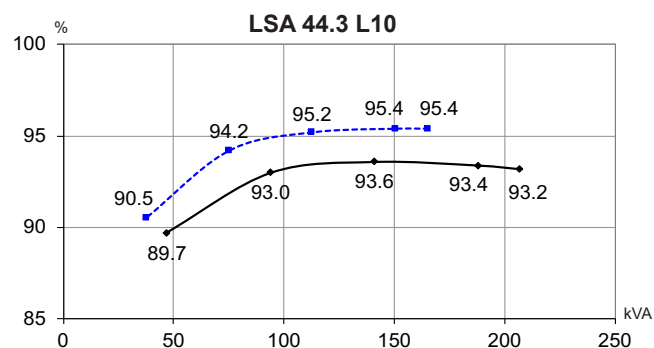
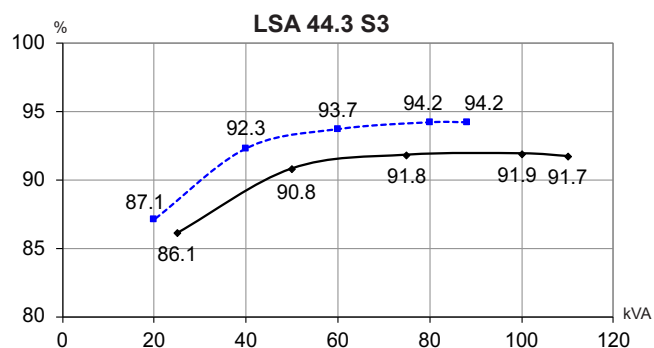
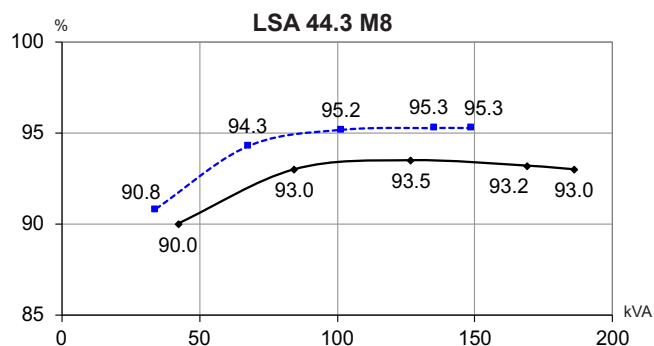
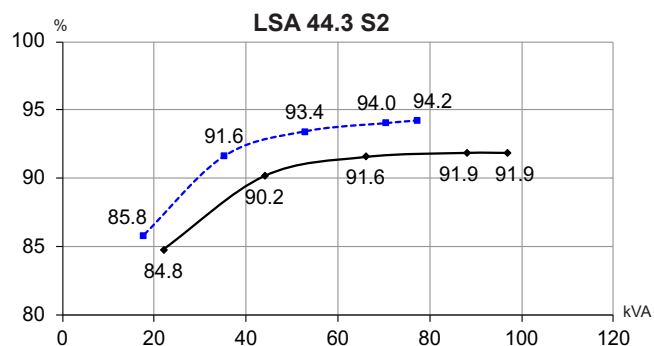
kVA / kW * - P.F. = 0.8																					
Duty/T°C		Continuous duty/40°C					Continuous duty/40°C					Stand-by/40°C					Stand-by/27°C				
Class/T°K		H/125°K					F/105°K					H/150°K					H/163°K				
Phase		3 ph.			1 ph.		3 ph.			1 ph.		3 ph.			1 ph.		3 ph.			1 ph.	
Y		380V	416V	440V	480V	ΔΔ	380V	416V	440V	480V	ΔΔ	380V	416V	440V	480V	ΔΔ	380V	416V	440V	480V	ΔΔ
Δ		220V	240V			240V	220V	240V			240V	220V	240V			240V	220V	240V			240V
YY		208V	220V	240V			208V	220V	240V			208V	220V	240V			208V	220V	240V		
LSA 44.3 S2	kVA	69	76	80	88	46	63	69	73	80	42	73	81	85	93	49	76	84	88	97	51
	kW	55	61	64	70	37	50	55	58	64	33.5	58	65	68	74	39	61	67	70	78	41
LSA 44.3 S3	kVA	79	87	92	100	52	72	79	84	91	47	84	92	98	106	55	87	96	101	110	57
	kW	63	70	74	80	42	58	63	67	73	37.5	67	74	78	85	44	70	77	81	88	46
LSA 44.3 S4	kVA	89	98	103	113	59	81	89	94	103	54	94	104	109	120	63	98	108	113	124	65
	kW	71	78	82	90	47	65	71	75	82	43	75	83	87	96	50	78	86	90	99	52
LSA 44.3 S5	kVA	99	108	115	125	65	90	99	105	114	59	105	114	122	133	69	109	119	127	138	72
	kW	79	86	92	100	52	72	79	84	91	47	84	91	98	106	55	87	95	102	110	58
LSA 44.3 M6	kVA	124	135	143	156	76	113	123	130	142	69	131	143	152	165	81	136	149	157	172	84
	kW	99	108	114	125	61	90	98	104	114	55	105	114	122	132	65	109	119	126	138	67
LSA 44.3 M8	kVA	134	146	155	169	81	122	133	141	154	74	142	155	164	179	86	147	161	171	186	89
	kW	107	117	124	135	65	98	106	113	123	59	114	124	131	143	69	118	129	137	149	71
LSA 44.3 L10	kVA	148	163	172	188	95	135	148	157	171	86	157	173	182	199	101	163	179	189	207	105
	kW	118	130	138	150	76	108	118	126	137	69	126	138	146	159	81	130	143	151	166	84
LSA 44.3 L12	kVA	165	179	189	206	105	150	163	172	187	96	175	190	200	218	111	182	197	208	227	116
	kW	132	143	151	165	84	120	130	138	150	77	140	152	160	174	89	146	158	166	182	93
LSA 44.3 VL13	kVA	180	195	210	225	113	164	177	191	205	102	191	207	223	239	119	200	215	231	250	124
	kW	144	156	168	180	90	131	142	153	164	82	153	166	178	191	95	160	172	185	200	99
LSA 44.3 VL14	kVA	200	215	230	250	125	182	196	209	228	114	212	228	244	265	133	220	237	253	275	136
	kW	160	172	184	200	100	146	157	167	182	91	170	182	195	212	106	176	190	202	220	109

* Values are rounded-off and are subject to change without notice by the manufacturer.

Efficiencies 400 V - 50 Hz (— P.F.: 0.8) (----- P.F.: 1)



Efficiencies 480 V - 60 Hz (— P.F.: 0.8) (----- P.F.: 1)



Reactances (%). Time constants (ms) - Class H / 400 V

	S2	S3	S4	S5	M6	M8	L10	L12	VL13	VL14
Kcc Short-circuit ratio	0.68	0.59	0.61	0.55	0.45	0.44	0.49	0.44	0.37	0.33
Xd Direct-axis synchronous reactance unsaturated	239	273	258	287	329	323	305	335	343	381
Xq Quadrature-axis synchronous reactance unsaturated	121	139	131	146	167	165	155	171	175	194
T'do No-load transient time constant	2308	2308	2211	2211	2154	2112	2077	2077	2025	2025
X'd Direct-axis transient reactance saturated	10.3	11.8	11.6	12.9	15.2	15.3	14.6	16.1	16.9	18.8
T'd Short-circuit transient time constant	100	100	100	100	100	100	100	100	100	100
X''d Direct-axis subtransient reactance saturated	6.2	7	7	7.7	9.1	9.1	8.8	9.6	10.1	11.3
T''d Subtransient time constant	10	10	10	10	10	10	10	10	10	10
X''q Quadrature-axis subtransient reactance saturated	13.2	15.1	14.5	16.1	18.6	18.3	17.4	19.1	19.7	21.9
Xo Zero sequence reactance	0.43	0.49	0.48	0.54	0.63	0.63	0.61	0.67	0.7	0.78
X2 Negative sequence reactance saturated	9.74	11.13	10.75	11.95	13.89	13.78	13.11	14.42	14.96	16.62
Ta Armature time constant	15	15	15	15	15	15	15	15	15	15

Other class H / 400 V data

io (A) No-load excitation current SHUNT	0.75	0.75	0.73	0.73	0.66	0.62	0.67	0.67	0.78	0.78
io (A) No-load excitation current AREP	0.97	0.97	0.94	0.94	0.85	0.81	0.86	0.86	0.78	0.78
ic (A) On-load excitation current SHUNT	2.07	2.33	2.11	2.31	2.47	2.37	2.45	2.71	3.17	3.53
ic (A) On-load excitation current AREP	2.67	3	2.71	2.98	3.18	3.05	3.15	3.49	3.17	3.53
uc (V) On-load excitation voltage SHUNT	23.1	25.8	26.5	28.9	30.6	29.3	29.9	32.7	16.2	17.9
uc (V) On-load excitation voltage AREP	18.6	20.7	21.3	23.2	24.5	23.5	24	26.3	16.2	17.9
ms Response time ($\Delta U = 20\%$ transient)	500	500	500	500	500	500	500	500	500	500
kVA Start ($\Delta U = 20\%$ cont. or $\Delta U = 30\%$ trans.) SHUNT*	184	184	292	293	310	334	371	379	487	487
kVA Start ($\Delta U = 20\%$ cont. or $\Delta U = 30\%$ trans.) AREP*	222	221	344	344	366	400	414	414	545	545
% Transient ΔU (on-load 4/4) SHUNT - P.F.: 0.8 _{LAG}	13.3	14.5	11.6	12.4	13.8	13.8	13.4	14.3	13	13.9
% Transient ΔU (on-load 4/4) AREP - P.F.: 0.8 _{LAG}	11.8	12.9	10.4	11.1	12.3	12.3	12	12.7	11.6	12.4
W No-load losses	2174	2174	2396	2396	2387	2478	2894	2946	2670	2670
W Heat dissipation	5025	5892	6073	6935	8254	8251	8914	10236	10165	11933

* P.F. = 0.6

Reactances (%). Time constants (ms) - Class H / 480 V

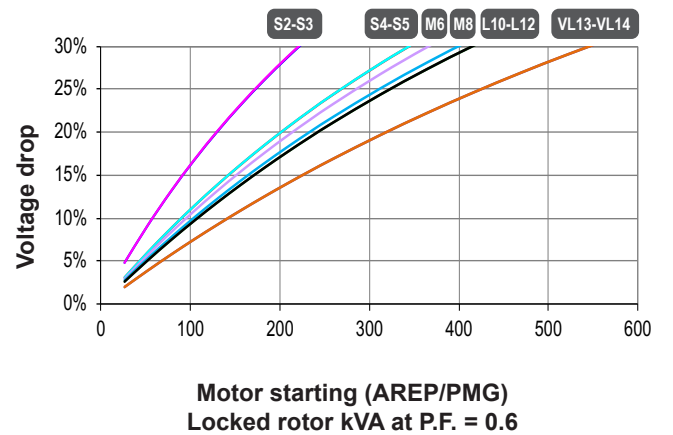
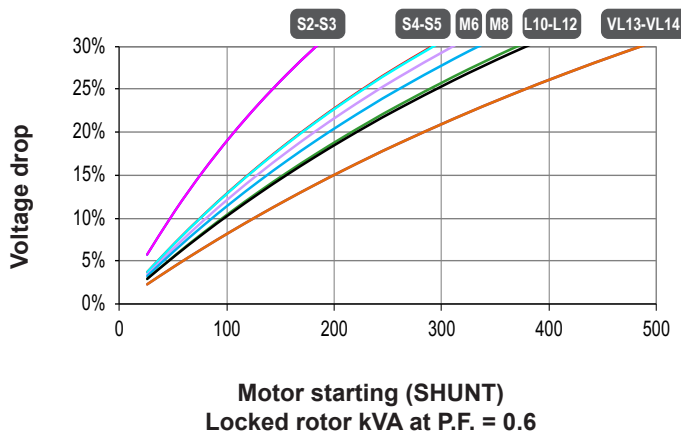
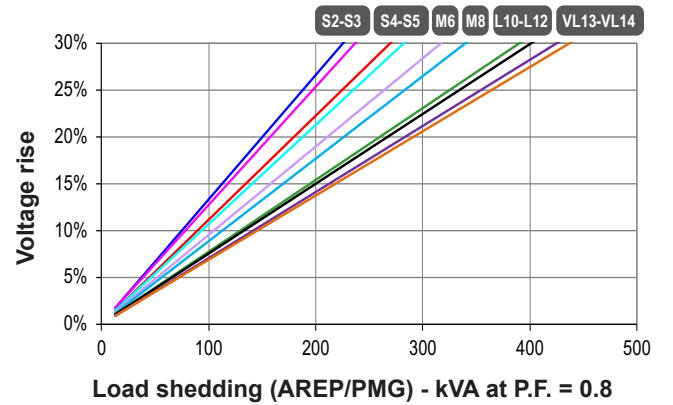
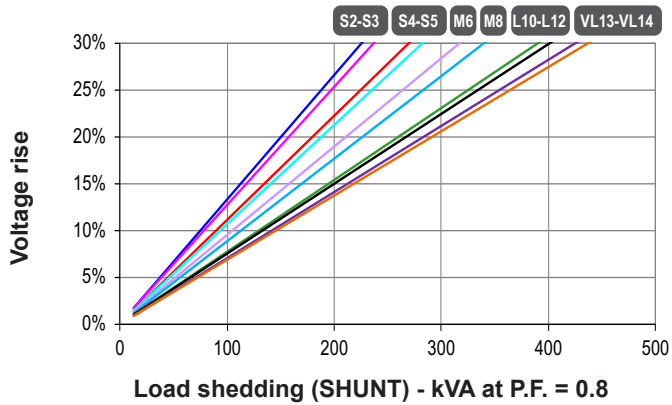
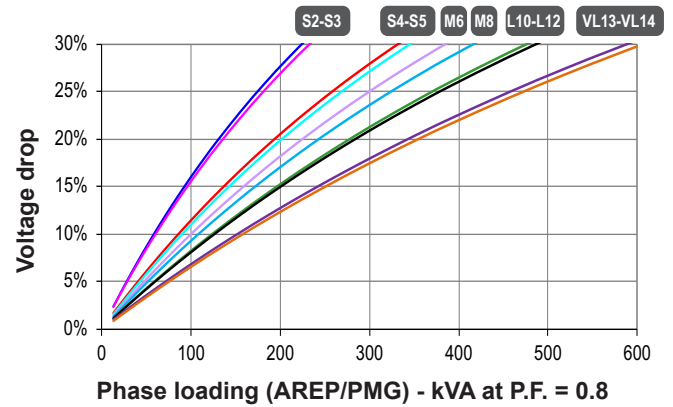
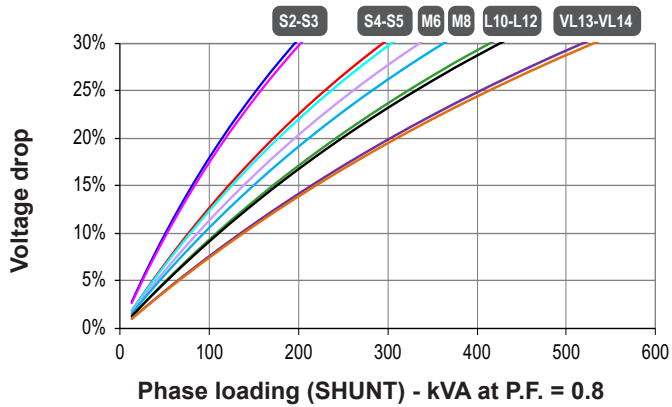
	S2	S3	S4	S5	M6	M8	L10	L12	VL13	VL14
Kcc Short-circuit ratio	0.65	0.57	0.58	0.53	0.43	0.42	0.47	0.43	0.36	0.32
Xd Direct-axis synchronous reactance unsaturated	250	284	270	299	342	337	318	349	358	397
Xq Quadrature-axis synchronous reactance unsaturated	127	145	137	152	174	172	162	178	182	202
T'do No-load transient time constant	2308	2308	2211	2211	2154	2112	2077	2077	2025	2025
X'd Direct-axis transient reactance saturated	10.8	12.3	12.2	13.5	15.8	15.9	15.3	16.8	17.6	19.6
T'd Short-circuit transient time constant	100	100	100	100	100	100	100	100	100	100
X''d Direct-axis subtransient reactance saturated	6.5	7.3	7.3	8.1	9.5	9.5	9.2	10	10.6	11.7
T''d Subtransient time constant	10	10	10	10	10	10	10	10	10	10
X''q Quadrature-axis subtransient reactance saturated	13.9	15.7	15.1	16.7	19.3	19.1	18.1	19.9	20.5	22.8
Xo Zero sequence reactance	0.45	0.51	0.5	0.56	0.66	0.66	0.63	0.7	0.73	0.81
X2 Negative sequence reactance saturated	10.2	11.59	11.25	12.44	14.44	14.37	13.7	15	15.59	17.32
Ta Armature time constant	15	15	15	15	15	15	15	15	15	15

Other class H / 480 V data

io (A) No-load excitation current SHUNT	0.75	0.75	0.73	0.73	0.66	0.62	0.67	0.67	0.77	0.77
io (A) No-load excitation current AREP	0.97	0.97	0.94	0.94	0.85	0.81	0.86	0.86	0.77	0.77
ic (A) On-load excitation current SHUNT	2.08	2.31	2.13	2.32	2.47	2.38	2.44	2.68	3.21	3.56
ic (A) On-load excitation current AREP	2.67	2.98	2.75	2.99	3.18	3.06	3.14	3.45	3.21	3.56
uc (V) On-load excitation voltage SHUNT	23.5	26	27	29.4	31	29.7	30.3	33	16.6	18.3
uc (V) On-load excitation voltage AREP	18.8	20.8	21.7	23.6	24.9	23.9	24.3	26.5	16.6	18.3
ms Response time ($\Delta U = 20\%$ transient)	500	500	500	500	500	500	500	500	500	500
kVA Start ($\Delta U = 20\%$ cont. or $\Delta U = 30\%$ trans.) SHUNT*	220	222	352	351	374	403	465	466	589	587
kVA Start ($\Delta U = 20\%$ cont. or $\Delta U = 30\%$ trans.) AREP*	265	265	422	423	446	481	541	544	708	706
% Transient ΔU (on-load 4/4) SHUNT - P.F.: 0.8 _{LAG}	13.7	14.9	12	12.7	14.1	14.2	13.8	14.7	13.3	14.3
% Transient ΔU (on-load 4/4) AREP - P.F.: 0.8 _{LAG}	12.2	13.2	10.7	11.4	12.6	12.6	12.3	13	11.9	12.7
W No-load losses	3188	3188	3501	3501	3506	3639	4217	4308	3928	3928
W Heat dissipation	6152	7047	7349	8241	9669	9747	10581	11988	12155	14140

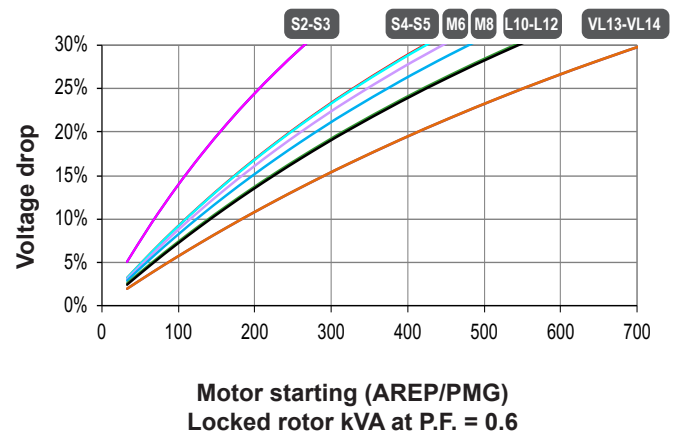
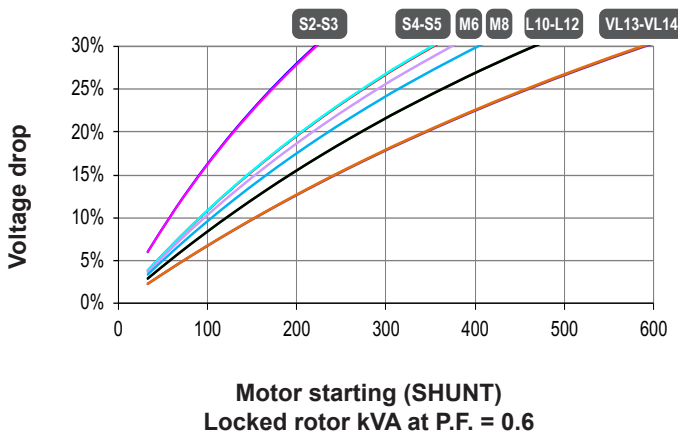
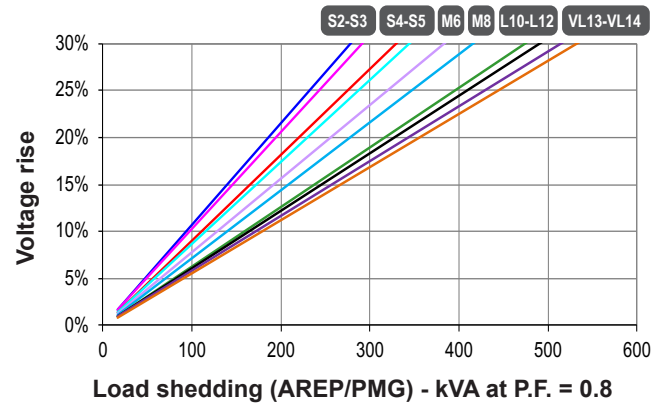
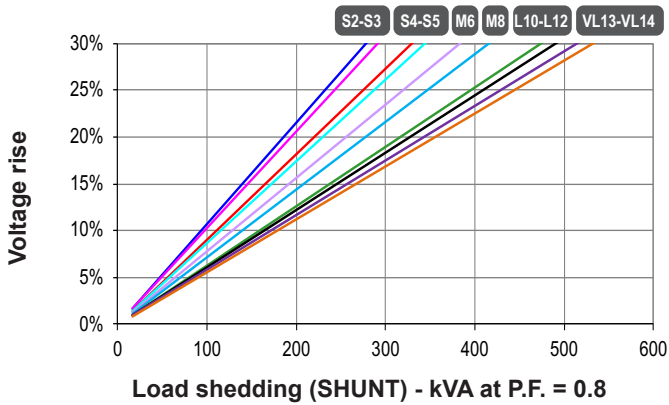
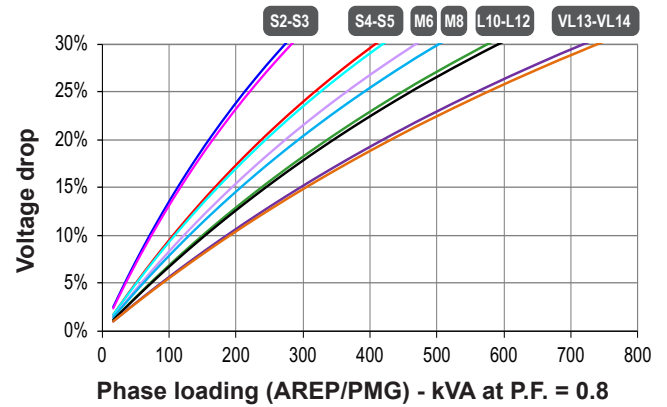
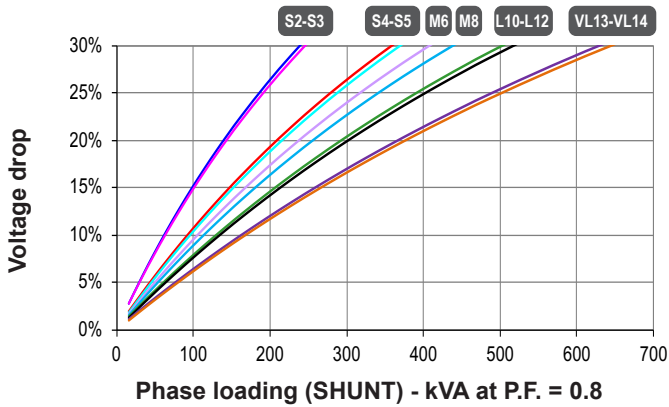
* P.F. = 0.6

Transient voltage variation 400V - 50 Hz



- 1) For a starting P.F. other than 0.6, the starting kVA must be multiplied by $K = \text{Sine P.F.} / 0.8$
- 2) For voltages other than 400V (Y), 230V (Δ) at 50 Hz, then kVA must be multiplied by $(400/U)^2$ or $(230/U)^2$.

Transient voltage variation 480V - 60 Hz

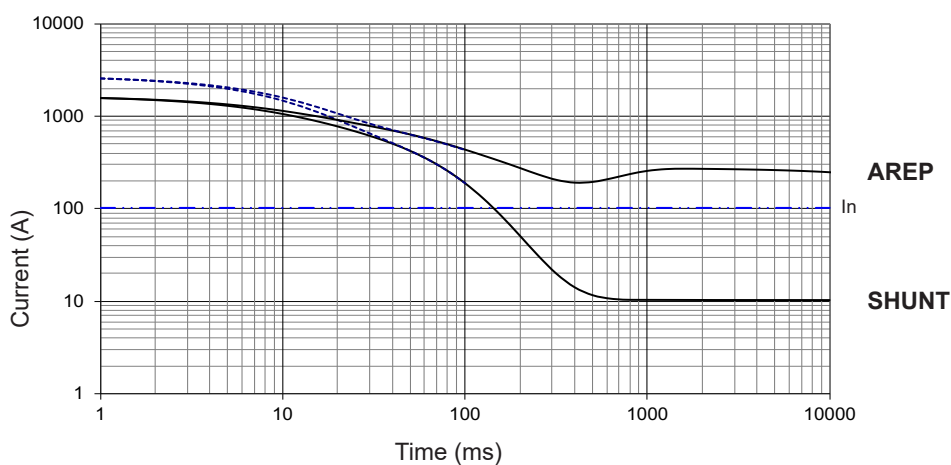


- 1) For a starting P.F. other than 0.6, the starting kVA must be multiplied by $K = \text{Sine P.F.} / 0.6$
- 2) For voltages other than 480V (Y), 277V (Δ), 240V (YY) at 60 Hz, then kVA must be multiplied by $(480/U)^2$ or $(277/U)^2$ or $(240/U)^2$.

3-phase short-circuit curves at no load and rated speed (star connection Y)

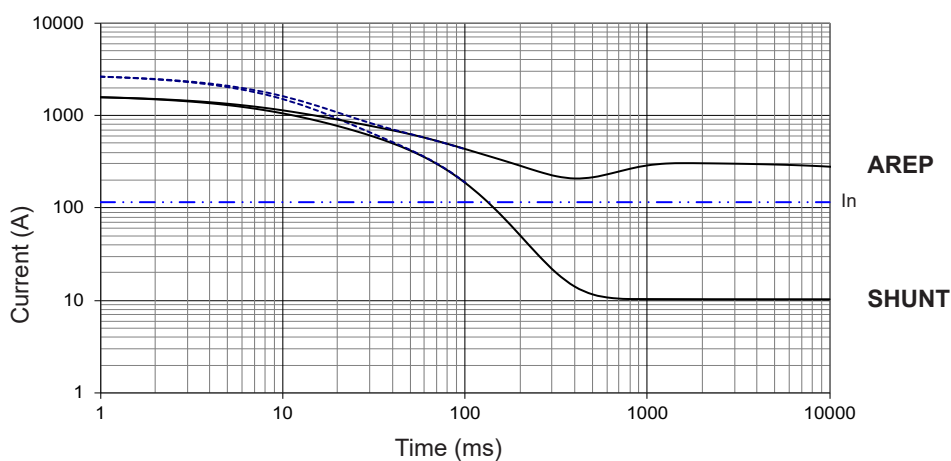
LSA 44.3 S2

Symmetrical —
Asymmetrical - - -



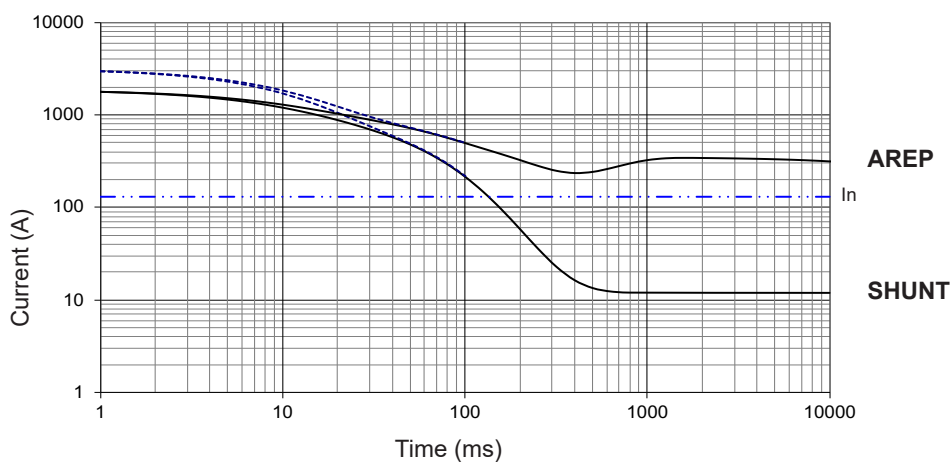
LSA 44.3 S3

Symmetrical —
Asymmetrical - - -



LSA 44.3 S4

Symmetrical —
Asymmetrical - - -



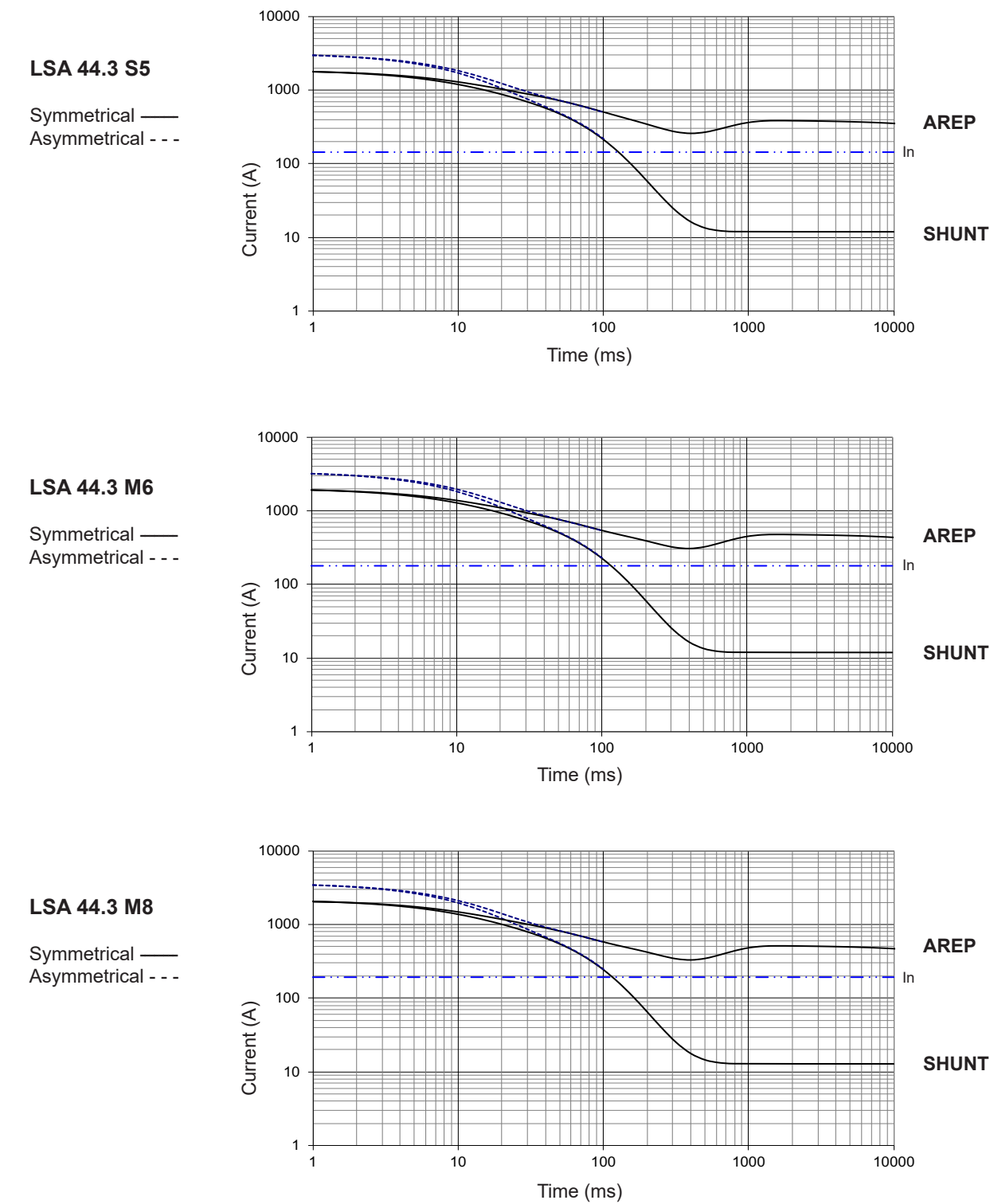
Influence due to connection

Curves shown are for star (Y) connection.

For other connections, use the following multiplication factors:

- Series delta : current value x 1.732 - Parallel star : current value x 2

3-phase short-circuit curves at no load and rated speed (star connection Y)



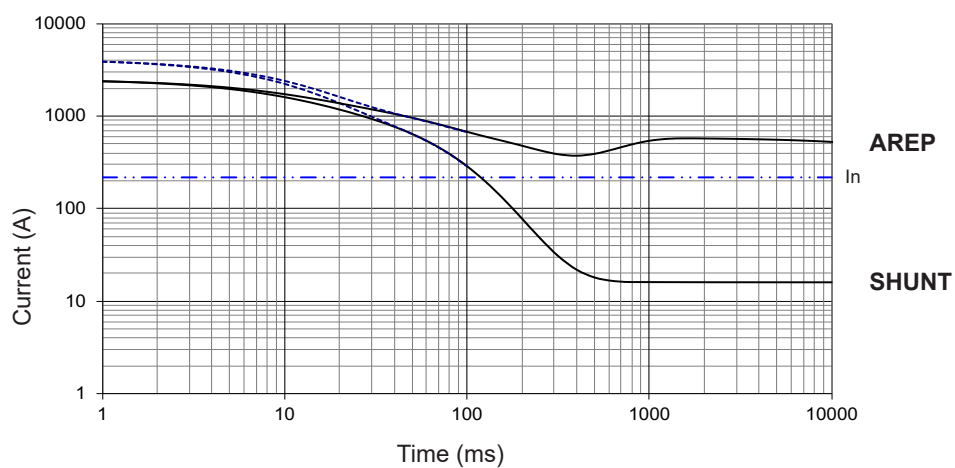
Influence due to short-circuit
Curves are based on a three-phase short-circuit.
For other types of short-circuit, use the following multiplication factors.

	3-phase	2-phase L/L	1-phase L/N
Instantaneous (max.)	1	0.87	1.3
Continuous	1	1.5	2.2
Maximum duration (AREP/PMG)	10 sec.	5 sec.	2 sec.

3-phase short-circuit curves at no load and rated speed (star connection Y)

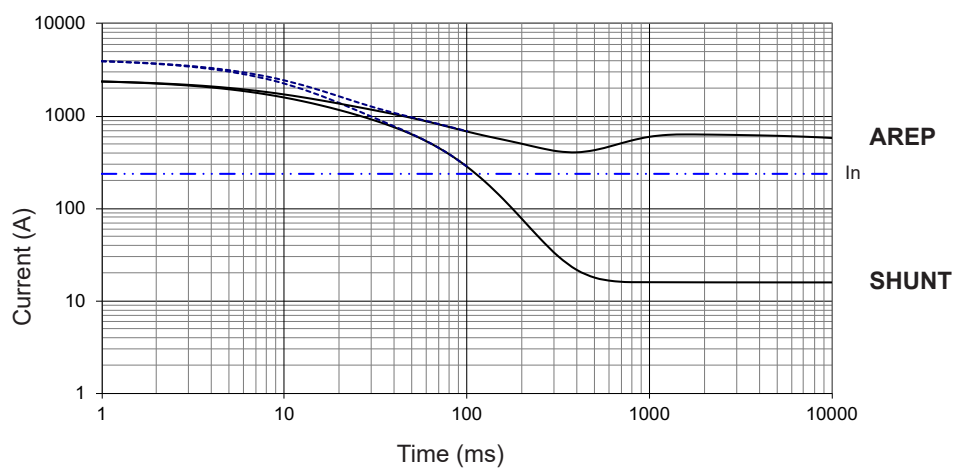
LSA 44.3 L10

Symmetrical —
Asymmetrical - - -



LSA 44.3 L12

Symmetrical —
Asymmetrical - - -



Influence due to connection

Curves shown are for star (Y) connection.

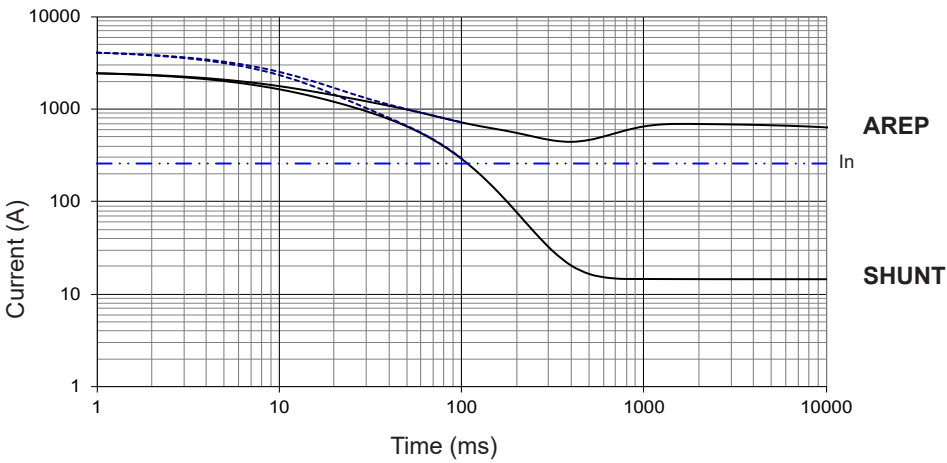
For other connections, use the following multiplication factors:

- Series delta : current value x 1.732 - Parallel star : current value x 2

3-phase short-circuit curves at no load and rated speed (star connection Y)

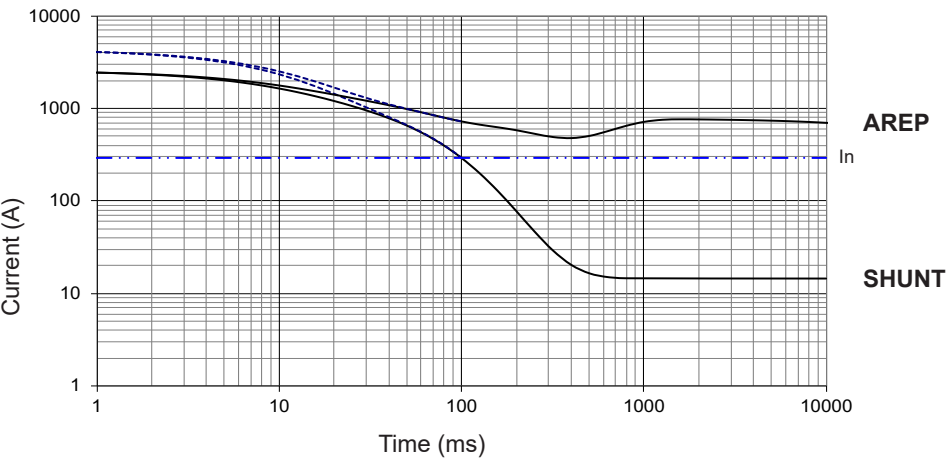
LSA 44.3 VL13

Symmetrical —
Asymmetrical - - -



LSA 44.3 VL14

Symmetrical —
Asymmetrical - - -



Influence due to short-circuit

Curves are based on a three-phase short-circuit.
For other types of short-circuit, use the following multiplication factors.

	3-phase	2-phase L/L	1-phase L/N
Instantaneous (max.)	1	0.87	1.3
Continuous	1	1.5	2.2
Maximum duration (AREP/PMG)	10 sec.	5 sec.	2 sec.

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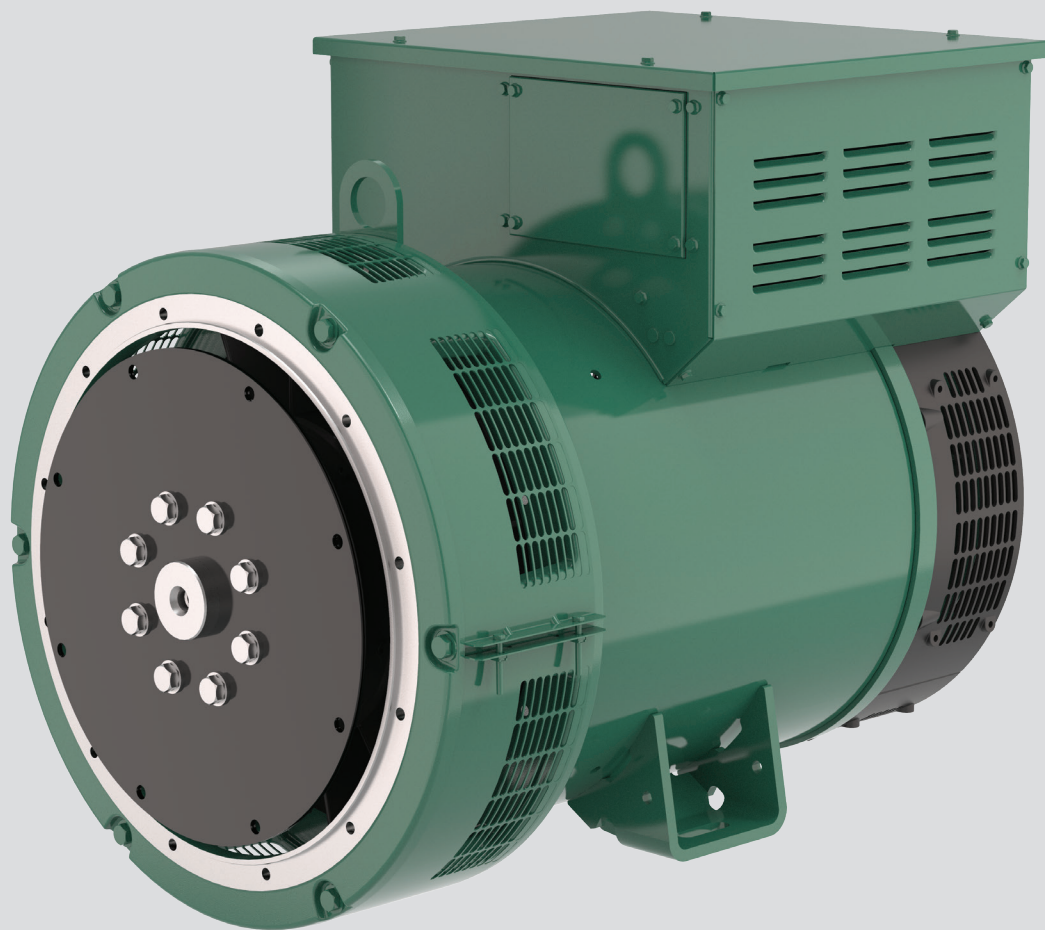
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Nidec
All for dreams

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Moteurs Leroy-Somer SAS. Siège : Bd Marcellin Leroy, CS 10015, 16915 Angoulême Cedex 9, France.
Capital social : 38 679 664 €, RCS Angoulême 338 567 258.



LSA 46.3

Low Voltage Alternator - 4 pole

230 to 365 kVA - 50 Hz / 288 to 456 kVA - 60 Hz

Electrical and mechanical data

LEROY-SOMER™

Nidec
All for dreams

The best of performance

Nidec Leroy-Somer LSA 46.3 alternator has been designed to offer you the best power generation performances. With its meticulous design and optimized architecture, the LSA 46.3 strikes the perfect balance between compactness, reliability, performance and longevity.

Whatever your application, the LSA 46.3 will meet your needs and will adapt to all situations.

Standards

Nidec Leroy-Somer LSA 46.3 alternator meets all key international standards and regulations, including IEC 60034, NEMA MG 1.32-33, ISO 8528-3, CSA C22.2 n°100-14 and UL 1446 (UL 1004 on request). Also compliant with IEC 61000-6-2, IEC 61000-6-3, IEC 61000-6-4, VDE 0875G, VDE 0875N and EN 55011, group 1 class A for European zone. Nidec Leroy-Somer LSA 46.3 alternator can be integrated in EC marked generator set, and bears EC, EAC and CMIM markings. It is designed, manufactured and marketed in an ISO 9001 and ISO 14001 quality assurance environment.

Electrical characteristics and performances

- Class H insulation
- 2/3 pitch winding, standard 12-wire (6) reconnectable
- Voltage range:
 - 50 Hz: 220V - 240V and 380V - 415V (440V)
 - 60 Hz: 208V - 240V and 380V - 480V
- High efficiency and motor starting capacity
- Other voltages are possible with optional adapted windings:
 - 50 Hz: 440V (no. 7), 500V (no. 9), 550V (no. 22), 600V (no. 23), 690V (no. 10 or 52)
 - 60 Hz: 380V and 416V (no. 8), 600V (no. 9), 690V (no. 22)

Excitation and regulation system

Excitation system				Regulation options		
AVR	SHUNT	AREP (option)	PMG (option)	C.T. Current transformer for paralleling	Mains paralleling	Remote voltage potentiometer
R250	Standard					√
D350	Option	Standard	Standard	√*		√
D550	Option	Option	Option	√*	√	√

*: only with AREP or PMG

3-phase sensing is included as a standard with digital regulators.

Protection system and options

- The LSA 46.3 is IP 23
- Complete winding protection for clean environments with relative humidity $\leq 95\%$, including indoor marine environments
- Options:
 - Filters on air inlet: derating 5%
 - Filters on air inlet and air outlet (IP 44): derating 10%
 - Reinforced winding protection for harsh environments and relative humidity greater than 95%
 - Space heater
 - Thermal protection for stator windings and shields

Mechanical construction

- Compact and rigid assembly to better withstand generator vibrations
- Steel frame
- Cast iron flanges and shields
- Two-bearing and single-bearing versions designed to be suitable for engines on the market
- Half-key balancing
- Greased for life bearings, regreasable bearings (optional)
- Direction of rotation: clockwise and anti-clockwise (without derating)

Terminal box design

- Easy access to the voltage regulator and to the connections
- Possible inclusion of accessories for paralleling, protection and measurement
- 9-way terminal block for voltage reconnection

General characteristics

Insulation class	H	Excitation system	SHUNT	AREP / PMG
Winding pitch	2/3 (wind. 6)	AVR type	R250	D350
Number of wires	12	Voltage regulation (*)	± 0.5%	± 0.25%
Protection	IP 23	Short-circuit current	-	300% (3 IN) : 10s
Altitude	≤ 1000 m	Total Harmonic Distortion THD (**)	no load < 2.5% - on load < 2.5%	
Overspeed	2250 R.P.M.	Waveform: NEMA = TIF (**)	< 50	
Air flow	0.48 m³/s (50 Hz) / 0.58 m³/s (60 Hz)	Waveform: I.E.C. = THF (**)	< 2%	

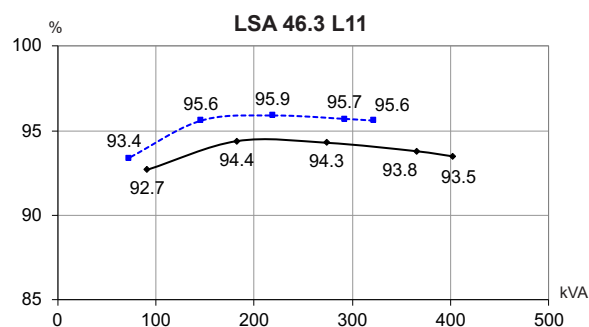
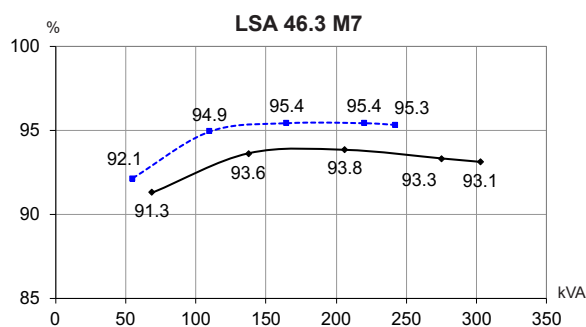
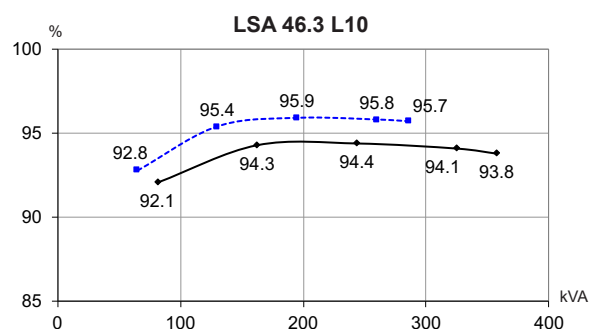
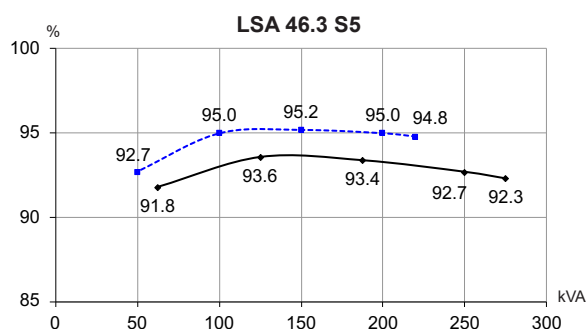
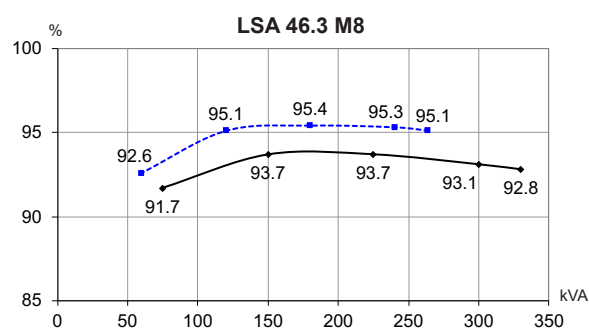
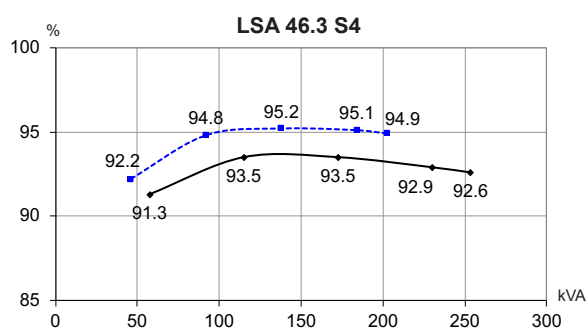
(*) Steady state (**) Total harmonic distortion between phases, no-load or on-load (non-distorting)

Ratings 50 Hz - 1500 R.P.M.

kVA / kW - P.F. = 0.8																					
Duty/T°C	Continuous duty/40°C					Continuous duty/40°C					Stand-by/40°C					Stand-by/27°C					
Class/T°K	H/125°K					F/105°K					H/150°K					H/163°K					
Phase	3 ph.			1 ph.		3 ph.			1 ph.		3 ph.			1 ph.		3 ph.			1 ph.		
Y	380V	400V	415V	440V	ΔΔ	380V	400V	415V	440V	ΔΔ	380V	400V	415V	440V	ΔΔ	380V	400V	415V	440V	ΔΔ	
Δ	220V	230V	240V		230V	220V	230V	240V		230V	220V	230V	240V		230V	220V	230V	240V		230V	
YY		200V		220V			200V		220V			200V		220V			200V		220V		
LSA 46.3 S4	kVA	230	230	230	219	138	209	209	209	200	126	244	244	244	232	146	253	253	253	240	152
	kW	184	184	184	175	110	167	167	167	160	101	195	195	195	186	117	202	202	202	192	122
LSA 46.3 S5	kVA	240	250	250	238	150	218	228	228	216	137	254	265	265	252	159	264	275	275	261	165
	kW	192	200	200	190	120	174	182	182	173	110	204	212	212	202	127	211	220	220	209	132
LSA 46.3 M7	kVA	275	275	275	261	165	250	250	250	238	150	292	292	292	277	175	303	303	303	287	182
	kW	220	220	220	209	132	200	200	200	190	120	234	234	234	222	140	242	242	242	230	146
LSA 46.3 M8	kVA	290	300	300	285	180	264	273	273	259	164	307	318	318	302	191	319	330	330	313	200
	kW	232	240	240	228	144	211	218	218	207	131	246	254	254	242	153	255	264	264	250	160
LSA 46.3 L10	kVA	325	325	325	309	195	300	300	300	281	177	345	345	345	327	207	358	358	358	340	215
	kW	260	260	260	247	156	240	240	240	225	142	276	276	276	262	166	286	286	286	272	172
LSA 46.3 L11	kVA	350	365	365	347	210	319	332	332	316	191	371	387	387	368	225	385	400	400	380	231
	kW	280	292	292	277	168	255	266	266	253	153	297	310	310	294	180	308	320	320	304	185

Ratings 60 Hz - 1800 R.P.M.

kVA / kW - P.F. = 0.8																						
Duty/T°C		Continuous duty/40°C					Continuous duty/40°C					Stand-by/40°C					Stand-by/27°C					
Class/T°K		H/125°K					F/105°K					H/150°K					H/163°K					
Phase		3 ph.			1 ph.		3 ph.			1 ph.		3 ph.			1 ph.		3 ph.			1 ph.		
Y		380V	416V	440V	480V	ΔΔ	380V	416V	440V	480V	ΔΔ	380V	416V	440V	480V	ΔΔ	380V	416V	440V	480V	ΔΔ	
Δ		220V	240V			240V	220V	240V			240V	220V	240V			240V	220V	240V			240V	
YY			208V	220V	240V			208V	220V	240V			208V	220V	240V			208V	220V	240V		
LSA 46.3 S4		kVA	226	250	262	288	152	206	227	238	262	138	240	264	278	305	161	250	274	288	316	167
		kW	181	200	210	230	122	165	182	190	210	110	192	211	222	244	129	200	219	230	253	134
LSA 46.3 S5		kVA	245	265	280	313	165	223	241	255	284	150	260	281	297	331	175	270	292	308	344	182
		kW	196	212	224	250	132	178	193	204	227	120	208	225	238	265	140	216	234	246	275	146
LSA 46.3 M7		kVA	275	300	315	344	182	250	273	287	313	165	292	318	334	364	192	303	330	347	378	200
		kW	220	240	252	275	146	200	218	230	250	132	234	254	267	291	154	242	264	278	302	160
LSA 46.3 M8		kVA	290	315	340	375	200	264	287	309	337	180	307	334	360	395	210	319	347	375	412	218
		kW	232	252	272	300	160	211	230	247	270	144	246	267	288	316	168	255	278	300	330	174
LSA 46.3 L10		kVA	315	345	365	406	215	287	314	332	370	195	334	366	387	431	227	347	380	402	447	236
		kW	252	276	292	325	172	230	251	266	296	156	267	293	310	345	182	278	304	322	358	189
LSA 46.3 L11		kVA	360	393	419	456	231	328	358	381	415	210	382	417	444	483	250	396	432	461	502	254
		kW	288	314	335	365	185	262	286	305	332	168	305	333	355	386	200	317	346	369	402	203

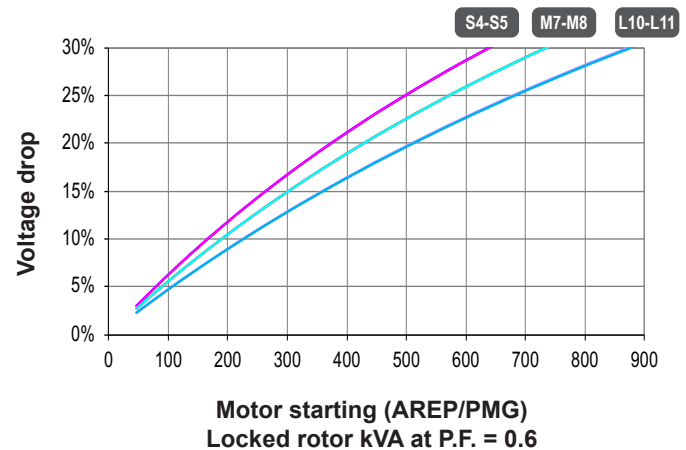
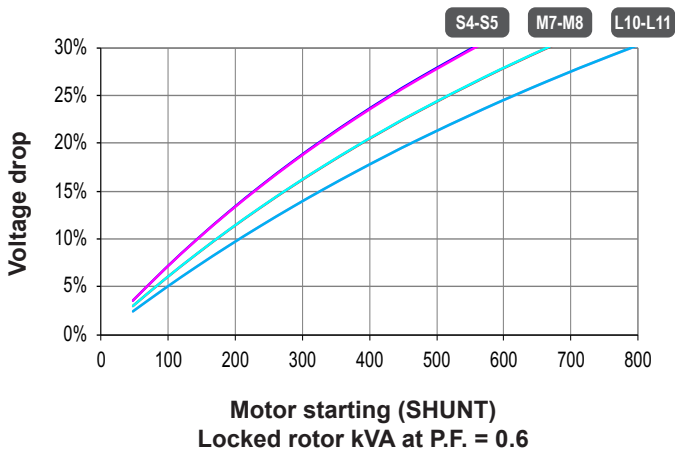
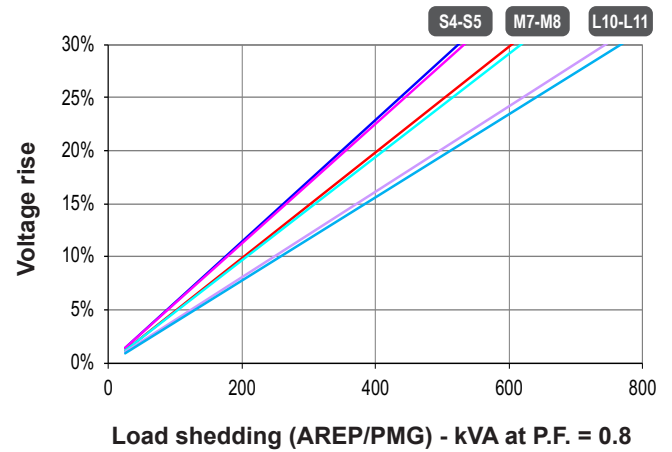
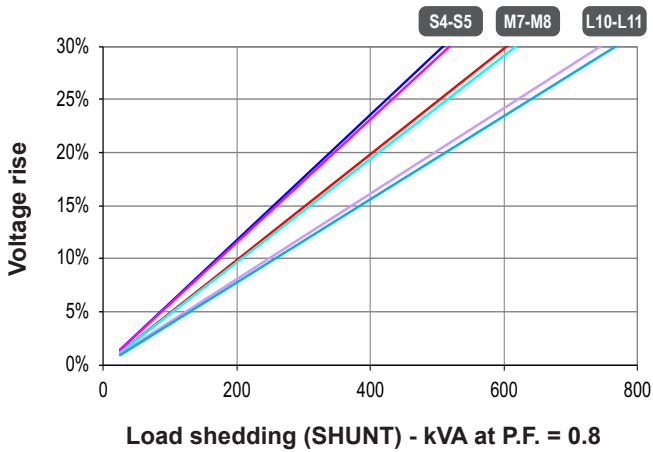
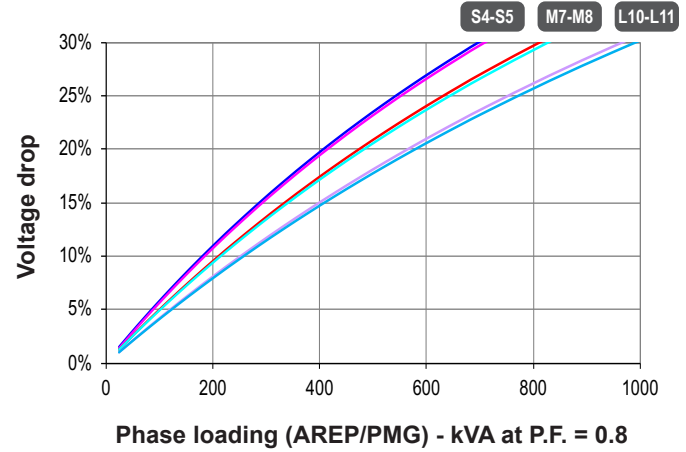
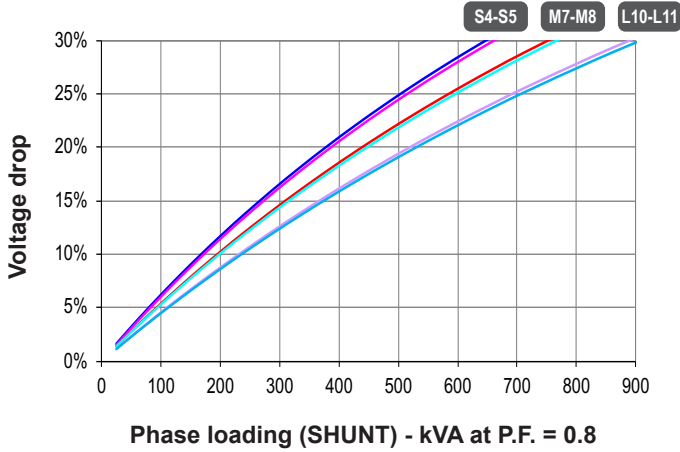
Efficiencies 400V - 50 Hz (..... P.F.: 1) (— P.F.: 0.8)

Reactances (%). Time constants (ms) - Class H / 400 V

		S4	S5	M7	M8	L10	L11
Kcc	Short-circuit ratio	0.4	0.36	0.49	0.44	0.44	0.39
Xd	Direct-axis synchronous reactance unsaturated	339	369	316	344	316	355
Xq	Quadrature-axis synchronous reactance unsaturated	173	188	161	175	161	181
T'do	No-load transient time constant	2452	2452	2543	2543	2686	2686
X'd	Direct-axis transient reactance saturated	13.8	15	12.4	13.5	11.7	13.2
T'd	Short-circuit transient time constant	100	100	100	100	100	100
X''d	Direct-axis subtransient reactance saturated	11	12	9.9	10.8	9.4	10.5
T''d	Subtransient time constant	10	10	10	10	10	10
X''q	Quadrature-axis subtransient reactance saturated	14.6	15.9	13.1	14.3	12.6	14.1
Xo	Zero sequence reactance	0.57	0.62	0.51	0.56	0.49	0.55
X2	Negative sequence reactance saturated	12.86	13.98	11.57	12.62	11.01	12.37
Ta	Armature time constant	15	15	15	15	15	15

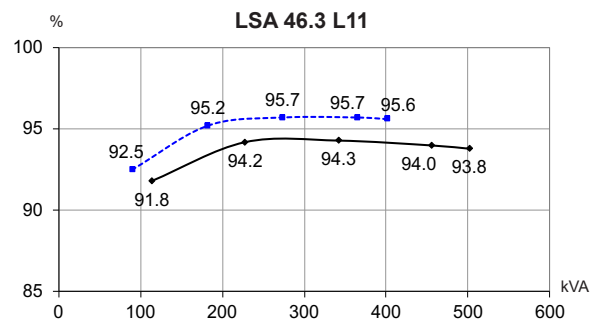
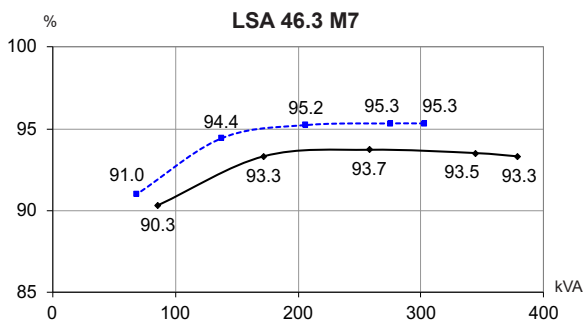
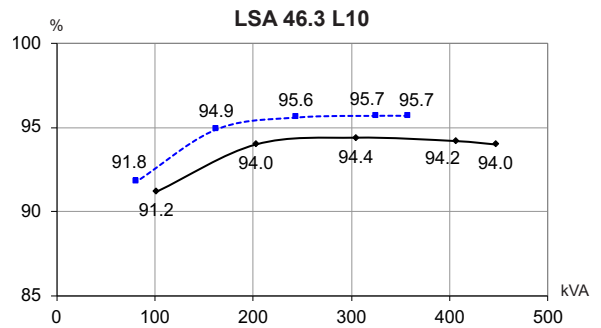
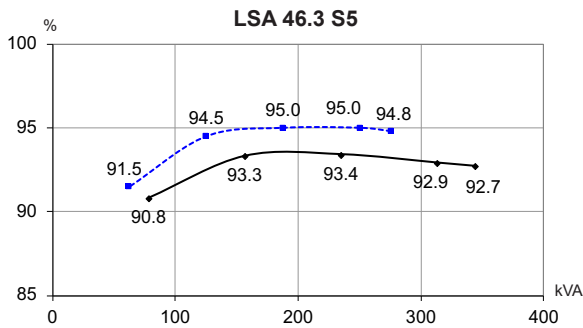
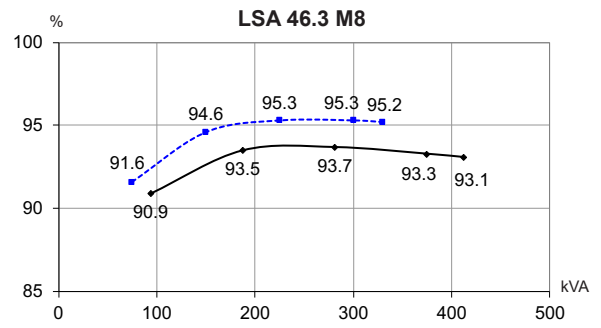
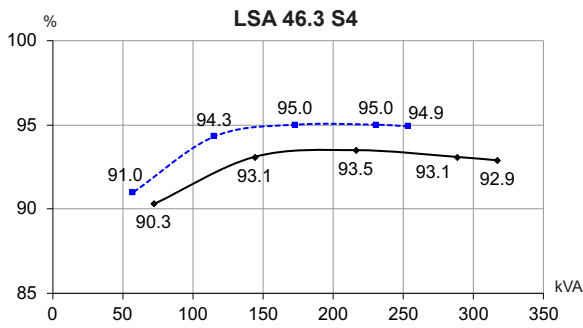
Other class H / 400 V data

io (A)	No-load excitation current (SHUNT/AREP)	0.78	0.78	0.94	0.94	0.81	0.81
ic (A)	On-load excitation current (SHUNT/AREP)	3.06	3.32	3.14	3.41	2.94	3.29
uc (V)	On-load excitation voltage (SHUNT/AREP)	41.4	44.6	46.2	49.7	42.8	47.5
ms	Response time ($\Delta U = 20\%$ transient)	500	500	500	500	500	500
kVA	Start ($\Delta U = 20\%$ cont. or 30% trans.) SHUNT	554	557	667	664	791	790
kVA	Start ($\Delta U = 20\%$ cont. or 30% trans.) AREP	639	640	736	738	876	880
%	Transient ΔU (on-load 4/4) SHUNT - P.F.: 0.8 _{LAG}	13.2	14	13.6	14.4	13.6	14.7
%	Transient ΔU (on-load 4/4) AREP - P.F.: 0.8 _{LAG}	12.4	13.1	12.7	13.5	12.6	13.7
W	No-load losses	3660	3660	4449	4449	4775	4775
W	Heat dissipation	13869	15662	15583	17615	16271	19169

Transient voltage variation 400V - 50 Hz



- 1) For a starting P.F. other than 0.6, the starting kVA must be multiplied by $K = \text{Sine P.F.} / 0.6$
- 2) For voltages other than 400V (Y), 230V (Δ) at 50 Hz, then kVA must be multiplied by $(400/U)^2$ or $(230/U)^2$.

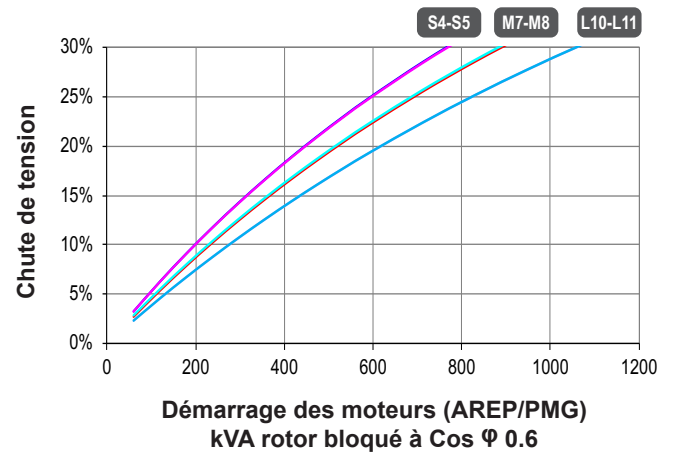
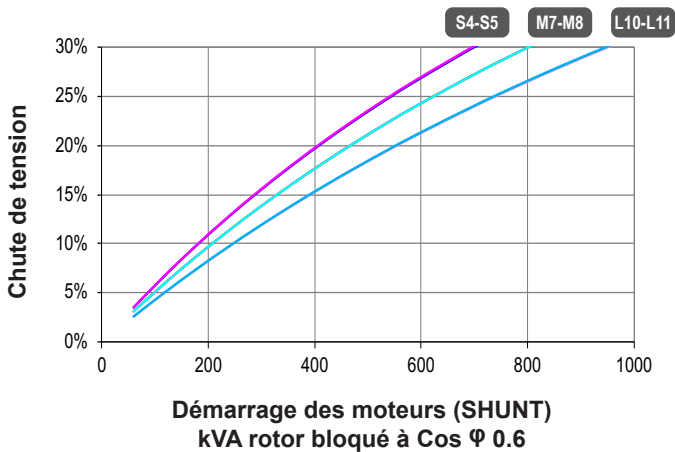
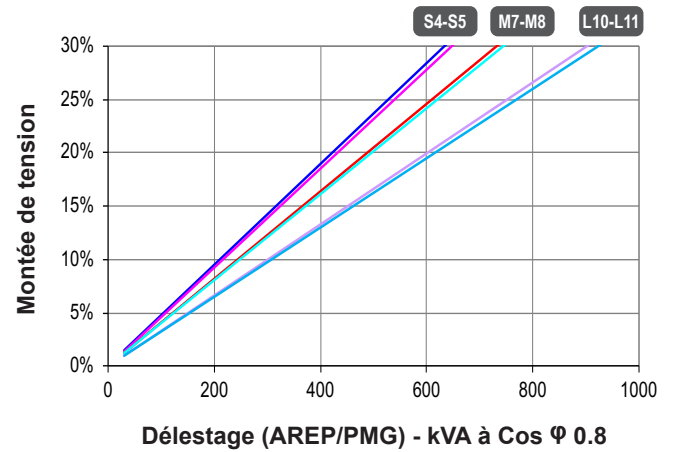
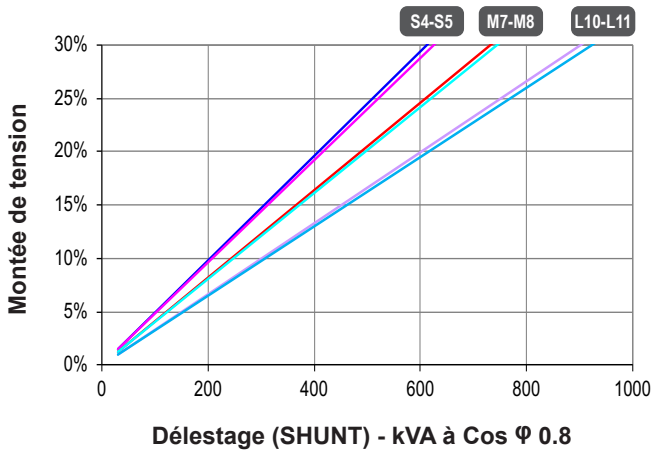
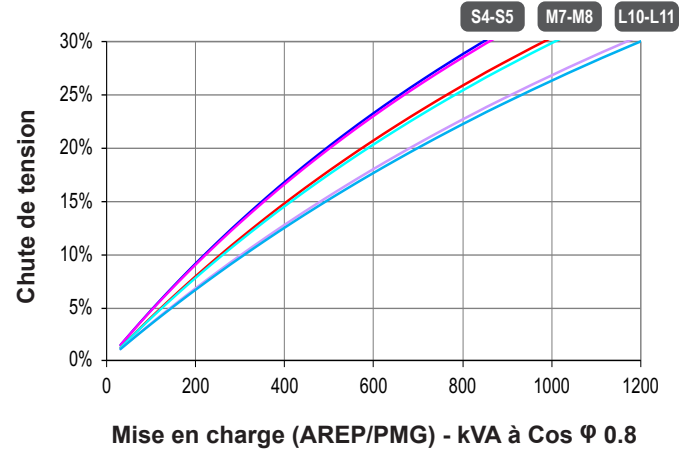
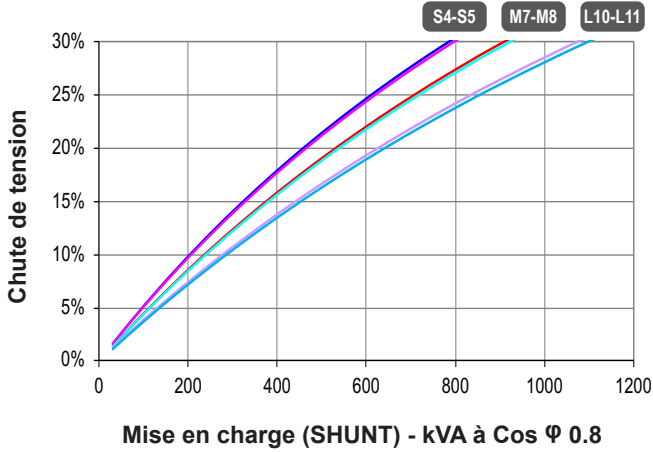
Efficiencies 480V - 60 Hz (..... P.F.: 1) (— P.F.: 0.8)

Reactances (%). Time constants (ms) - Class H / 480 V

		S4	S5	M7	M8	L10	L11
Kcc	Short-circuit ratio	0.38	0.35	0.47	0.43	0.42	0.37
Xd	Direct-axis synchronous reactance unsaturated	354	385	329	359	329	370
Xq	Quadrature-axis synchronous reactance unsaturated	180	196	168	183	168	188
T'do	No-load transient time constant	2452	2452	2543	2543	2686	2686
X'd	Direct-axis transient reactance saturated	14.4	15.7	12.9	14.1	12.2	13.7
T'd	Short-circuit transient time constant	100	100	100	100	100	100
X''d	Direct-axis subtransient reactance saturated	11.5	12.5	10.3	11.2	9.8	11
T''d	Subtransient time constant	10	10	10	10	10	10
X''q	Quadrature-axis subtransient reactance saturated	15.2	16.6	13.7	14.9	13.1	14.1
Xo	Zero sequence reactance	0.6	0.65	0.53	0.58	0.51	0.57
X2	Negative sequence reactance saturated	13.42	14.58	12.06	13.14	11.46	12.87
Ta	Armature time constant	15	15	15	15	15	15

Other class H / 480 V data

io (A)	No-load excitation current (SHUNT/AREP)	0.78	0.78	0.94	0.94	0.81	0.81
ic (A)	On-load excitation current (SHUNT/AREP)	3.05	3.3	3.13	3.38	2.92	3.26
uc (V)	On-load excitation voltage (SHUNT/AREP)	41.7	44.9	46.5	50	43.1	47.7
ms	Response time ($\Delta U = 20\%$ transient)	500	500	500	500	500	500
kVA	Start ($\Delta U = 20\%$ cont. or 30% trans.) SHUNT	699	695	799	800	947	945
kVA	Start ($\Delta U = 20\%$ cont. or 30% trans.) AREP	765	766	887	883	1055	1053
%	Transient ΔU (on-load 4/4) SHUNT - P.F.: 0.8 _{LAG}	13.6	14.4	14	14.9	13.9	15.1
%	Transient ΔU (on-load 4/4) AREP - P.F.: 0.8 _{LAG}	12.8	13.5	13.1	13.8	13	14
W	No-load losses	5549	5549	6617	6617	7115	7115
W	Heat dissipation	16897	18905	18951	21212	19891	23158

Transient voltage variation 480V - 60 Hz

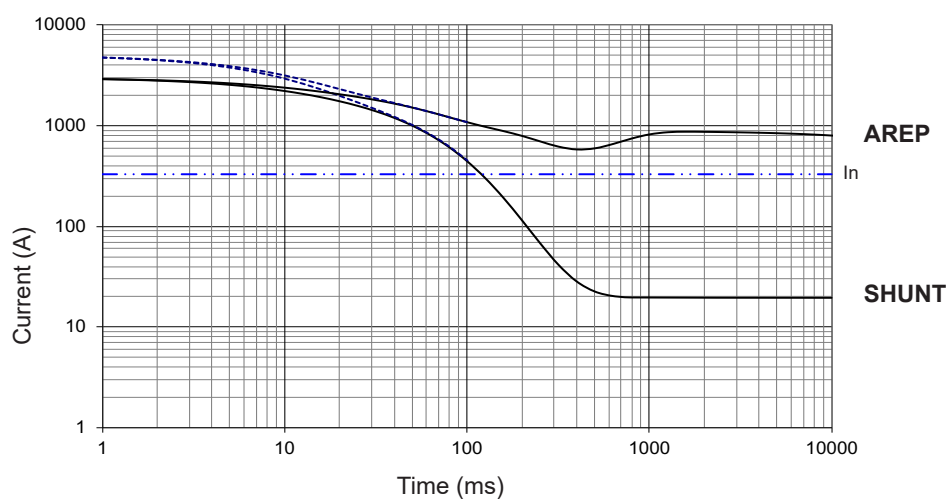


- 1) For a starting P.F. other than 0.6, the starting kVA must be multiplied by $K = \text{Sine P.F.} / 0.6$
- 2) For voltages other than 480V (Y), 277V (Δ), 240V (YY) at 60 Hz, then kVA must be multiplied by $(480/U)^2$ or $(277/U)^2$ or $(240/U)^2$.

3-phase short-circuit curves at no load and rated speed (star connection Y)

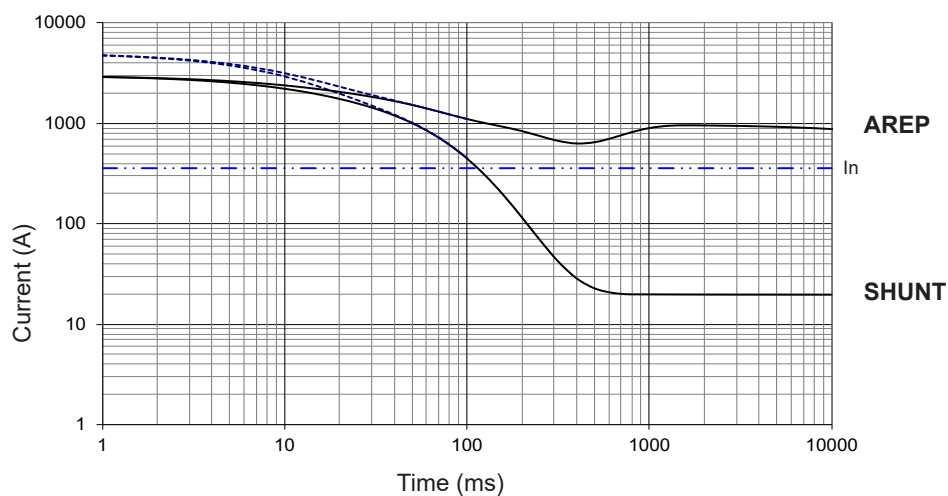
LSA 46.3 S4

Symmetrical —
Asymmetrical - - -



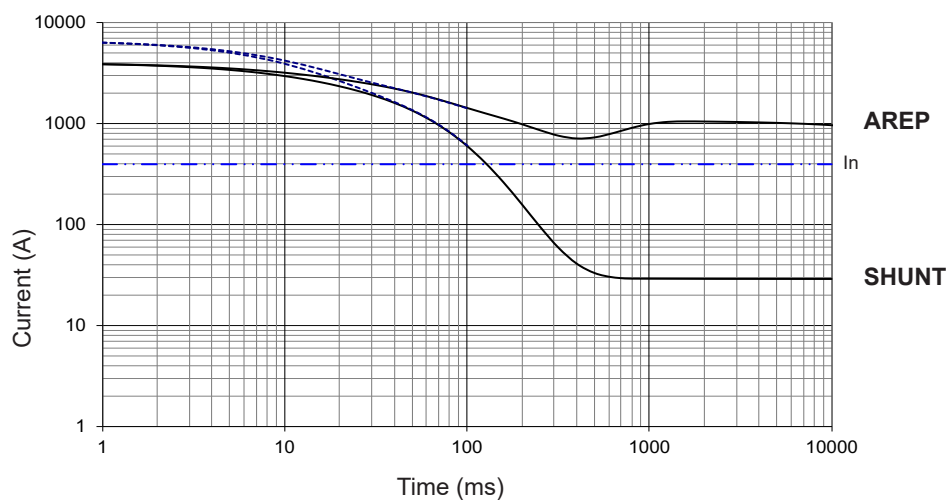
LSA 46.3 S5

Symmetrical —
Asymmetrical - - -



LSA 46.3 M7

Symmetrical —
Asymmetrical - - -



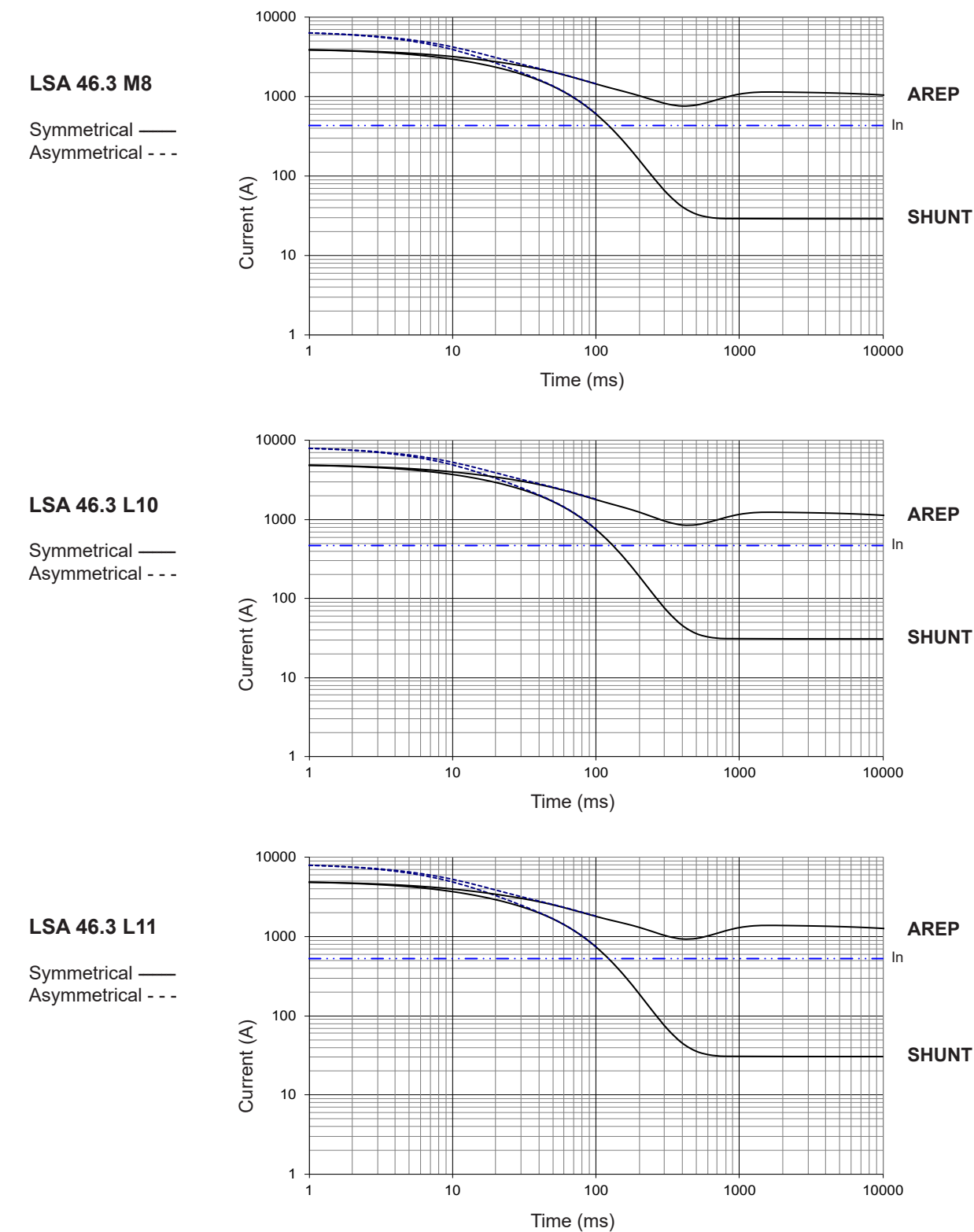
Influence due to connection

Curves shown are for star (Y) connection.

For other connections, use the following multiplication factors:

- Series delta : current value x 1.732 - Parallel star : current value x 2

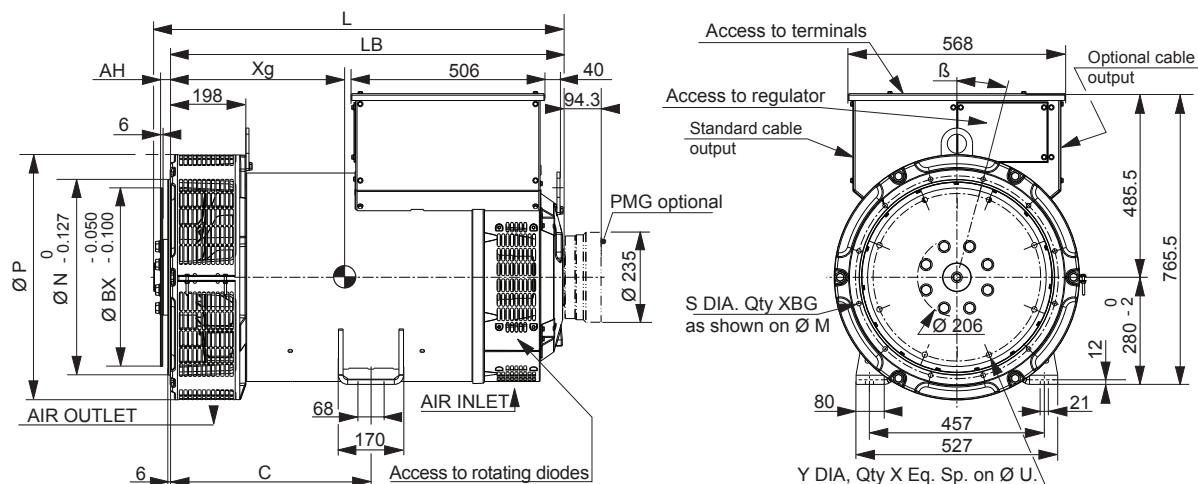
3-phase short-circuit curves at no load and rated speed (star connection Y)



Influence due to short-circuit
Curves are based on a three-phase short-circuit.
For other types of short-circuit, use the following multiplication factors.

	3-phase	2-phase L/L	1-phase L/N
Instantaneous (max.)	1	0.87	1.3
Continuous	1	1.5	2.2
Maximum duration (AREP/PMG)	10 sec.	5 sec.	2 sec.

Single-bearing dimensions



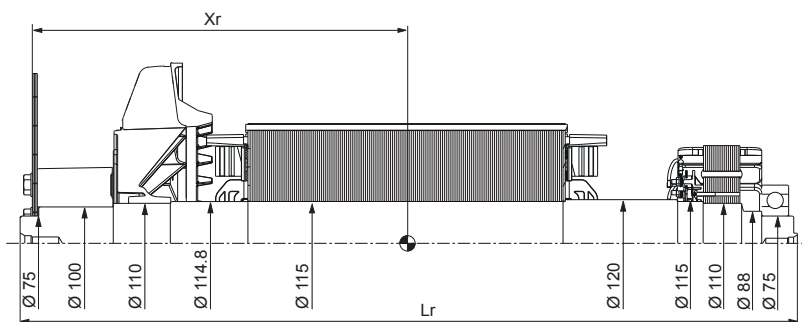
Dimensions (mm) and weight						Coupling			
Type	L without PMG maxi*	LB	Xg	C	Weight (kg)	Flex plate	11 ½	14	18
LSA 46.3 S4	944	892	423	429	674	Flange S.A.E 3	X		
LSA 46.3 S5	944	892	423	429	682	Flange S.A.E 2	X		
LSA 46.3 M7	989	937	445	429	754	Flange S.A.E 1	X	X	
LSA 46.3 M8	989	937	445	429	754	Flange S.A.E ½		X	
LSA 46.3 L10**	1084	1032	493	525	888	Flange S.A.E 0		X	X
LSA 46.3 L11**	1084	1032	493	525	888				

* L maxi = LB + AH maxi + 12.4 (only for SAE 11 ½) ** Shaft height = 355 mm optional

Flange (mm)							Flex plate (mm)					
S.A.E.	P	N	M	XBG	S	β°	S.A.E.	BX	U	X	Y	AH
3	600*/641	409.575	428.625	12	11	15°	11 ½	352.42	333.38	8	11	39.6
2	600*/641	447.675	466.725	12	11	15°	14	466.72	438.15	8	14	25.4
1	600*/641	511.175	530.225	12	12	15°	18*	571.5	542.92	6	17	15.7
½	713	584.2	619.125	12	14	15°						
0	713	647.7	679.45	16	14	11° 15'						

* Specific dimension LSA 46.3 S4

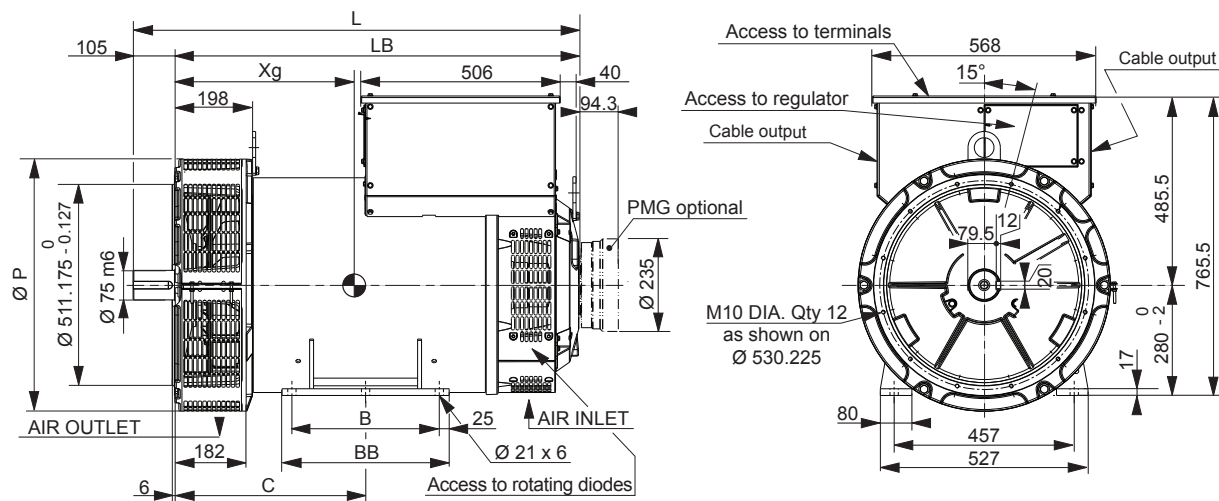
Torsional analysis data



Centre of gravity: Xr (mm), Rotor length: Lr (mm), Weight: M (kg), Moment of inertia: J (kgm²): (4J = MD²)								
Flex plate	S.A.E. 11 ½				S.A.E. 14			
Type	Xr	Lr	M	J	Xr	Lr	M	J
LSA 46.3 S4	431	928	277	2.93	416	928	277	3.09
LSA 46.3 S5	431	928	277	2.93	416	928	277	3.09
LSA 46.3 M7	459	973	307	3.23	444	973	307	3.39
LSA 46.3 M8	459	973	307	3.32	444	973	307	3.39
LSA 46.3 L10	507	1068	362	3.96	493	1068	362	4.12
LSA 46.3 L11	507	1068	362	3.96	493	1068	362	4.12

NOTE : Dimensions are for information only and may be subject to modifications. Contractual 2D drawings can be downloaded from the Leroy-Somer site, 3D drawing files are available upon request.
The torsional analysis of the transmission is imperative. All values are available upon request.

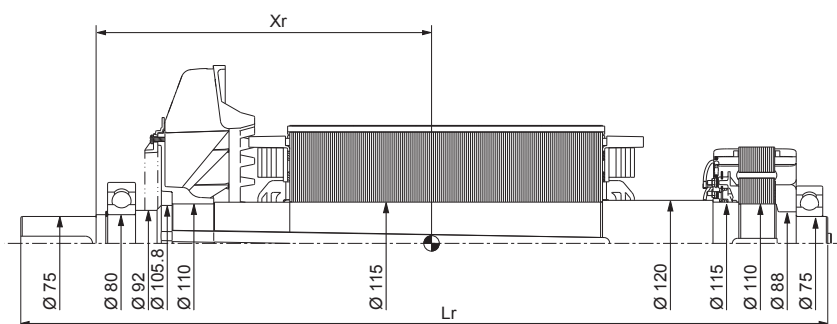
Two-bearing dimensions



Dimensions (mm) and weight

Type	L without PMG	LB	C	BB	B	P	Xg	Weight (kg)
LSA 46.3 S4	997	892	389	368	318	600	427	674
LSA 46.3 S5	997	892	389	368	318	640	427	682
LSA 46.3 M7	1042	937	389	368	318	640	449	754
LSA 46.3 M8	1042	937	389	368	318	640	449	754
LSA 46.3 L10	1137	1032	485	424	374	640	496	888
LSA 46.3 L11	1137	1032	485	424	374	640	496	888

Torsional analysis data



Centre of gravity: Xr (mm), Rotor length: Lr (mm), Weight: M (kg), Moment of inertia: J (kgm²): (4J = MD²)

Type	Xr	Lr	M	J
LSA 46.3 S4	430	990	250	2.76
LSA 46.3 S5	430	990	250	2.76
LSA 46.3 M7	456	1035	280	3.09
LSA 46.3 M8	456	1035	280	3.09
LSA 46.3 L10	503	1130	336	3.79
LSA 46.3 L11	503	1130	336	3.79

NOTE : Dimensions are for information only and may be subject to modifications. Contractual 2D drawings can be downloaded from the Leroy-Somer site, 3D drawing files are available upon request.
The torsional analysis of the transmission is imperative. All values are available upon request.

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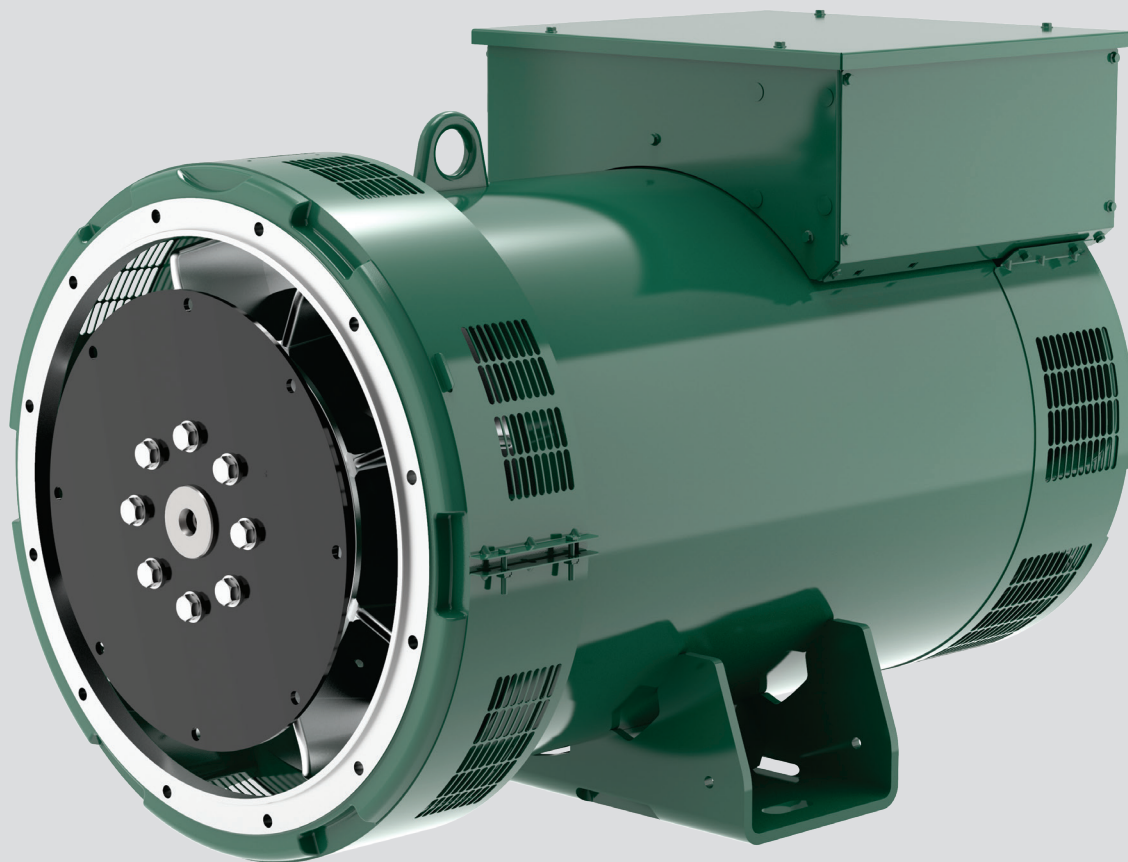
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Nidec
All for dreams

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Moteurs Leroy-Somer SAS. Siège : Bd Marcellin Leroy, CS 10015, 16915 Angoulême Cedex 9, France.
Capital social : 38 679 664 €, RCS Angoulême 338 567 258.



LSA 47.3

Low Voltage Alternator - 4 pole

410 to 660 kVA - 50 Hz / 510 to 825 kVA - 60 Hz
Electrical and mechanical data

LEROY-SOMER™

Nidec
All for dreams

The best of performance

Nidec Leroy-Somer LSA 47.3 alternator has been designed to offer you the best power generation performances. With its meticulous design and optimized architecture, the LSA 47.3 strikes the perfect balance between compactness, reliability, performance and longevity.

Whatever your application, the LSA 47.3 will meet your needs and will adapt to all situations.

Standards

Nidec Leroy-Somer LSA 47.3 alternator meets all key international standards and regulations, including IEC 60034, NEMA MG 1.32-33, ISO 8528-3, CSA C22.2 n°100-14 and UL 1446 (UL 1004 on request). Also compliant with IEC 61000-6-2, IEC 61000-6-3, IEC 61000-6-4, VDE 0875G, VDE 0875N and EN 55011, group 1 class A for European zone.

Nidec Leroy-Somer LSA 47.3 alternator can be integrated in EC marked generator set, and bears EC, EAC and CMIM markings. It is designed, manufactured and marketed in an ISO 9001 and ISO 14001 quality assurance environment.

Electrical characteristics and performances

- Class H insulation
- 2/3 pitch winding, standard 12-wire (6) reconnectable
- Voltage range:
 - 50 Hz: 220V - 240V and 380V - 415V (440V)
 - 60 Hz: 208V - 240V and 380V - 480V
- High efficiency and motor starting capacity
- Other voltages are possible with optional adapted windings:
 - 50 Hz: 440V (no. 7), 500V (no. 9), 550V (no. 22 or 23), 600V (no. 22 or 23), 690V (no. 10 or 52)
 - 60 Hz: 380V and 416V (no. 8), 600V (no. 9), 690V (no. 22 or 23)

Excitation and regulation system

Excitation system				Regulation options		
AVR	SHUNT	AREP (option)	PMG (option)	C.T. Current transformer for paralleling	Mains paralleling	Remote voltage potentiometer
R250	Standard					√
D350	Option	Standard	Standard	√*		√
D550	Option	Option	Option	√*	√	√

*: only with AREP or PMG

3-phase sensing is included as a standard with digital regulators.

Protection system and options

- The LSA 47.3 is IP 23
- Complete winding protection for clean environments with relative humidity $\leq 95\%$, including indoor marine environments
- Options:
 - Filters on air inlet: derating 5%
 - Filters on air inlet and air outlet (IP 44): derating 10%
 - Reinforced winding protection for harsh environments and relative humidity greater than 95%
 - Space heater
 - Thermal protection for stator windings and shields

Mechanical construction

- Compact and rigid assembly to better withstand generator vibrations
- Steel frame
- Cast iron flanges and shields
- Two-bearing and single-bearing versions designed to be suitable for engines on the market
- Half-key balancing
- Greased for life bearings, regreasable bearings (optional)
- Standard direction of rotation: clockwise when looking at the drive end view (for anti-clockwise, derate the machine by 5%)

Terminal box design

- Easy access to the voltage regulator and to the connections
- Possible inclusion of accessories for paralleling, protection and measurement
- 9-way terminal block for voltage reconnection

General characteristics

Insulation class	H	Excitation system	SHUNT	AREP / PMG
Winding pitch	2/3 (wind. 6)	AVR type	R250	D350
Number of wires	12	Voltage regulation (*)	± 0.5%	± 0.25%
Protection	IP 23	Short-circuit current	-	300% (3 IN) : 10s
Altitude	≤ 1000 m	Total Harmonic Distortion THD (**)	no load < 1.5% - on load < 2%	
Overspeed	2250 R.P.M.	Waveform: NEMA = TIF (**)	< 50	
Air flow	0.9 m³/s (50 Hz) / 1.1 m³/s (60 Hz)	Waveform: I.E.C. = THF (**)	< 2%	

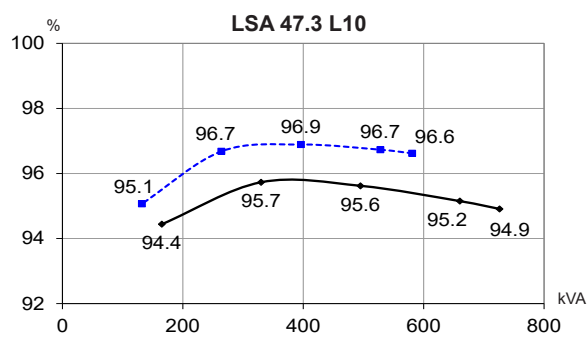
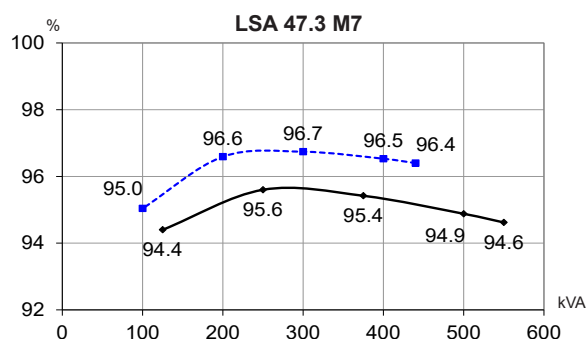
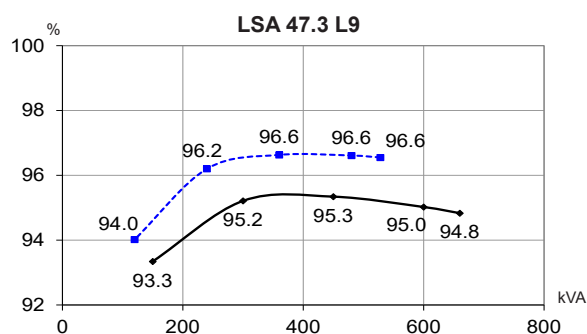
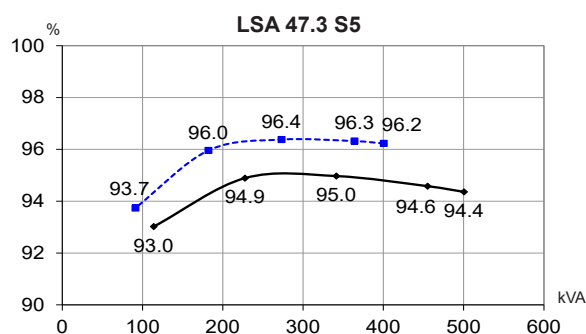
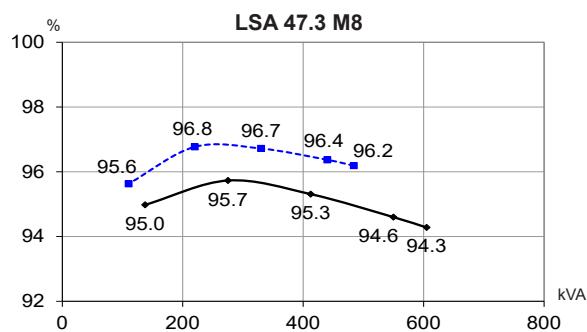
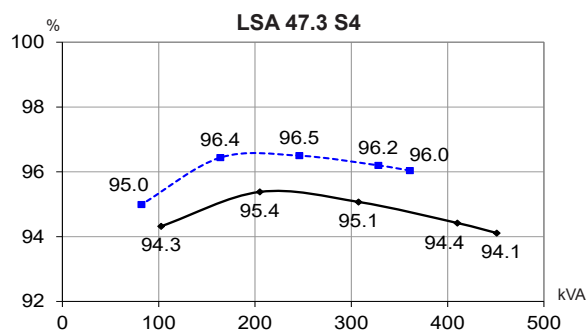
(*) Steady state (**) Total harmonic distortion between phases, no-load or on-load (non-distorting)

Ratings 50 Hz - 1500 R.P.M.

kVA / kW - P.F. = 0.8																	
Duty / T° C		Continuous / 40 °C				Continuous / 40 °C				Stand-by / 40 °C				Stand-by / 27 °C			
Class / T° K		H / 125° K				F / 105° K				H / 150° K				H / 163° K			
Phase		3 ph.				3 ph.				3 ph.				3 ph.			
Y		380V	400V	415V	440V	380V	400V	415V	440V	380V	400V	415V	440V	380V	400V	415V	440V
Δ		220V	230V	240V		220V	230V	240V		220V	230V	240V		220V	230V	240V	
YY			200V		220V		200V		220V		200V		220V		200V		220V
LSA 47.3 S4	kVA	410	410	410	400	375	375	375	364	435	435	435	424	450	450	450	440
	kW	328	328	328	320	300	300	300	291	348	348	348	339	360	360	360	352
LSA 47.3 S5	kVA	455	455	455	445	415	415	415	405	480	480	480	472	500	500	500	490
	kW	364	364	364	356	332	332	332	324	384	384	384	378	400	400	400	392
LSA 47.3 M7	kVA	500	500	500	490	465	465	465	449	550	550	550	519	570	570	570	539
	kW	400	400	400	392	372	372	372	359	440	440	440	415	456	456	456	431
LSA 47.3 M8	kVA	550	550	550	540	500	500	500	491	585	585	585	572	600	600	600	594
	kW	440	440	440	432	400	400	400	393	468	468	468	458	480	480	480	475
LSA 47.3 L9	kVA	600	600	600	550	545	545	545	501	635	635	635	583	660	660	660	605
	kW	480	480	480	440	436	436	436	401	508	508	508	466	528	528	528	484
LSA 47.3 L10	kVA	645	660	660	630	587	600	600	573	684	730	730	668	710	745	745	693
	kW	516	528	528	504	470	480	480	458	547	584	584	534	568	596	596	554

Ratings 60 Hz - 1800 R.P.M.

kVA / kW - P.F. = 0.8																	
Duty / T° C		Continuous / 40 °C				Continuous / 40 °C				Stand-by / 40 °C				Stand-by / 27 °C			
Class / T° K		H / 125° K				F / 105° K				H / 150° K				H / 163° K			
Phase		3 ph.				3 ph.				3 ph.				3 ph.			
Y		380V	416V	440V	480V	380V	416V	440V	480V	380V	416V	440V	480V	380V	416V	440V	480V
Δ		220V	240V			220V	240V			220V	240V			220V	240V		
YY			208V	220V	240V		208V	220V	240V		208V	220V	240V		208V	220V	240V
LSA 47.3 S4	kVA	450	480	500	512	410	442	455	465	475	513	533	550	500	530	550	581
	kW	360	384	400	410	328	354	364	372	380	410	426	440	400	424	440	465
LSA 47.3 S5	kVA	475	510	531	570	441	473	493	520	505	543	566	605	527	562	585	625
	kW	380	408	425	456	353	378	394	416	404	434	453	484	422	450	468	500
LSA 47.3 M7	kVA	562	610	625	625	523	566	581	590	600	651	669	680	625	668	690	700
	kW	450	488	500	500	418	453	465	472	480	521	535	544	500	534	552	560
LSA 47.3 M8	kVA	562	610	630	690	523	566	587	632	600	651	672	730	625	671	705	750
	kW	450	488	504	552	418	453	470	506	480	521	538	584	500	537	564	600
LSA 47.3 L9	kVA	602	661	685	750	556	609	634	685	643	707	734	795	667	728	763	825
	kW	482	529	548	600	445	487	507	548	514	566	587	636	534	582	610	660
LSA 47.3 L10	kVA	650	715	755	825	590	650	685	750	690	760	800	875	720	785	830	910
	kW	520	572	604	660	472	520	548	600	552	608	640	700	576	628	664	728

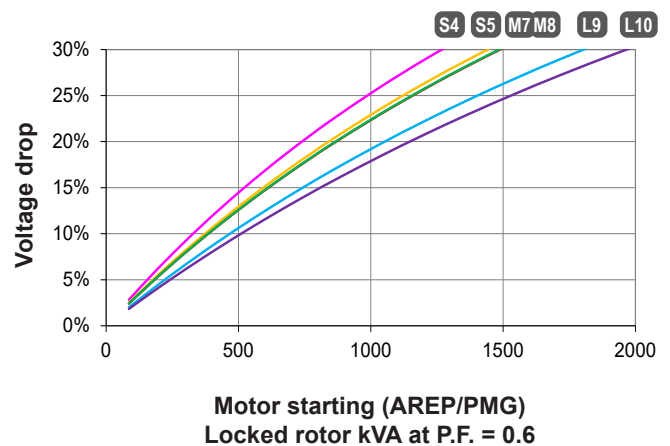
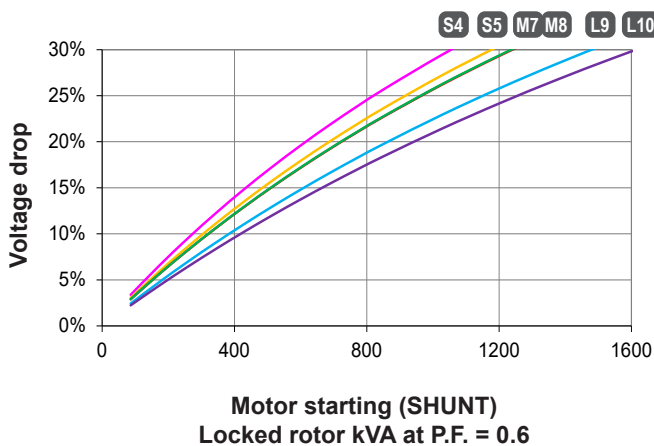
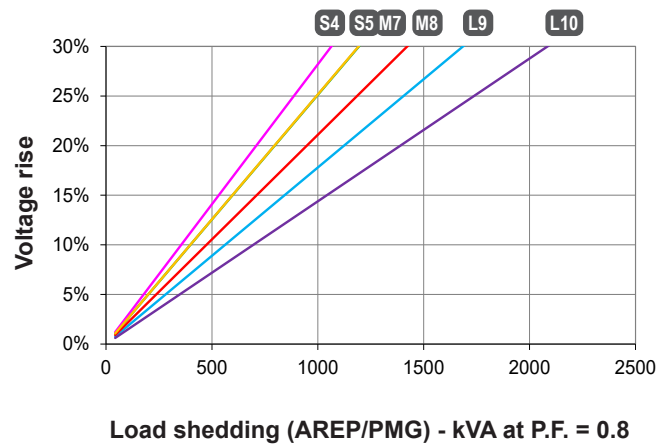
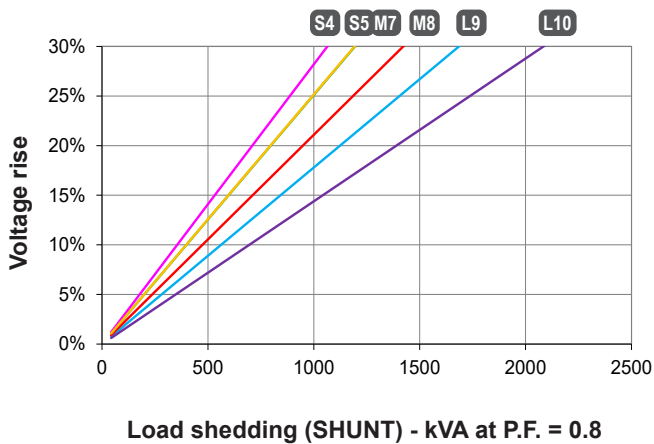
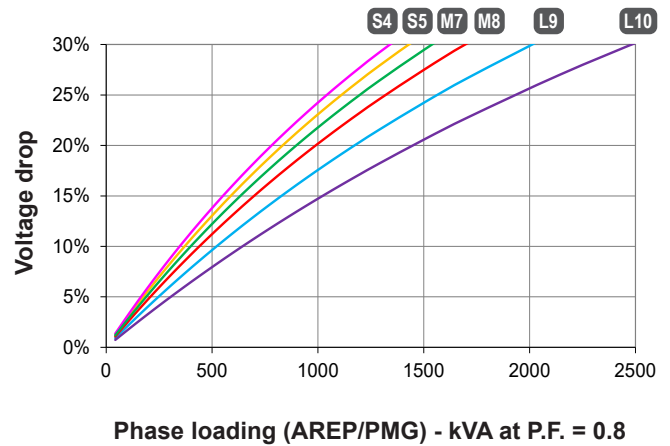
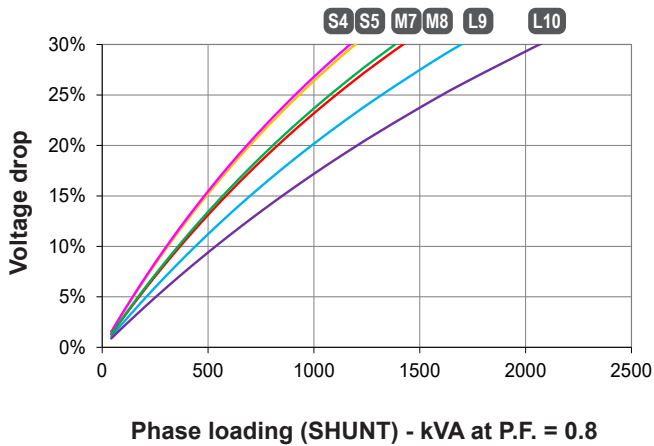
Efficiencies 400V - 50 Hz (..... P.F.: 1) (— P.F.: 0.8)

Reactances (%). Time constants (ms) - Class H / 400 V

		S4	S5	M7	M8	L9	L10
Kcc	Short-circuit ratio	0.29	0.51	0.35	0.27	0.55	0.41
Xd	Direct-axis synchronous reactance unsaturated	402	302	366	432	294	343
Xq	Quadrature-axis synchronous reactance unsaturated	205	154	187	220	150	175
T'do	No-load transient time constant	2068	2030	1968	1931	1881	1857
X'd	Direct-axis transient reactance saturated	19.4	14.8	18.6	22.3	15.6	18.5
T'd	Short-circuit transient time constant	100	100	100	100	100	100
X''d	Direct-axis subtransient reactance saturated	11.2	8.5	10.7	12.8	9	10.6
T''d	Subtransient time constant	10	10	10	10	10	10
X''q	Quadrature-axis subtransient reactance saturated	12.6	10.1	13.6	17	12.5	15.2
Xo	Zero sequence reactance	0.81	0.62	0.77	0.93	0.65	0.77
X2	Negative sequence reactance saturated	11.93	9.34	12.17	14.96	10.78	12.92
Ta	Armature time constant	15	15	15	15	15	15

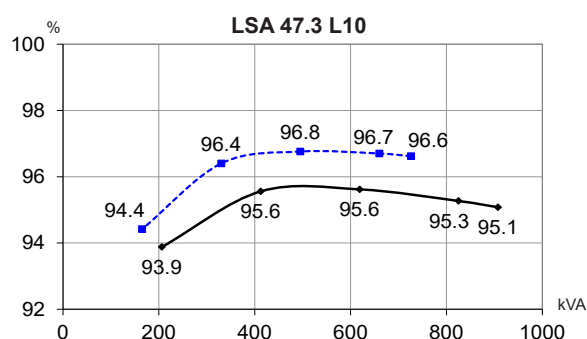
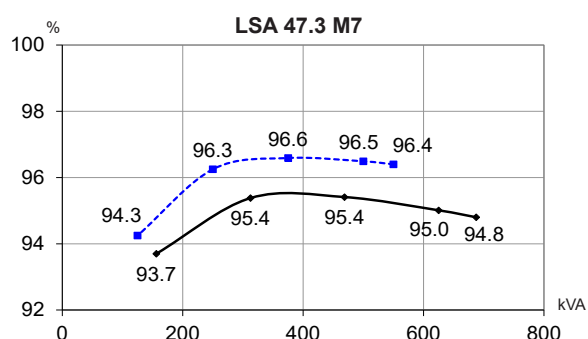
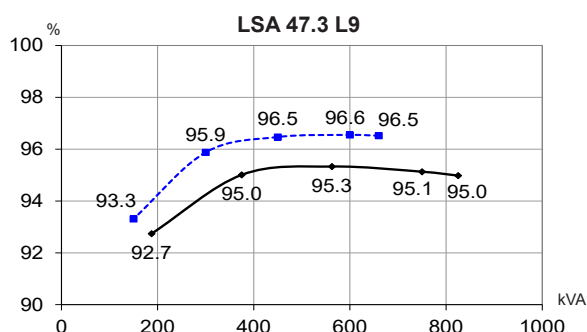
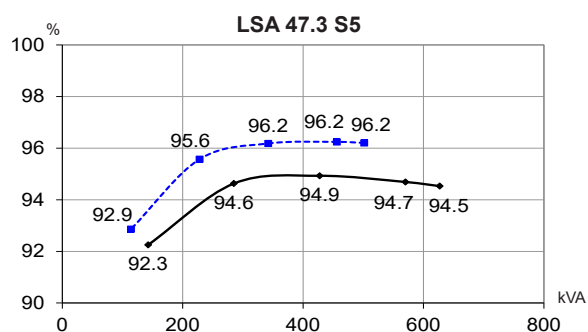
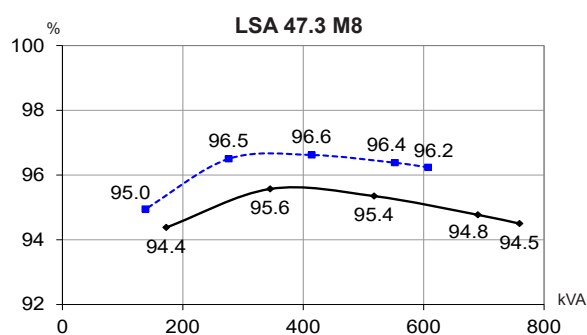
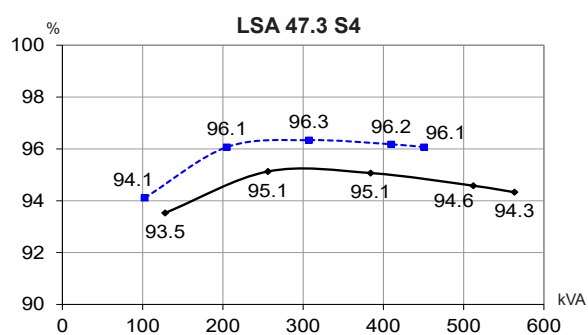
Other class H / 400 V data

io (A)	No-load excitation current (SHUNT / AREP)	0.68	1.07	0.79	0.68	1.13	0.92
ic (A)	On-load excitation current (SHUNT / AREP)	3.1	3.36	3.21	3.34	3.48	3.44
uc (V)	On-load excitation voltage (SHUNT / AREP)	32.4	35	33.5	34.8	36.1	35.6
ms	Response time ($\Delta U = 20\%$ transient)	500	500	500	500	500	500
kVA	Start ($\Delta U = 20\%$ cont. or 30% trans.) SHUNT	1055	1178	1240	1237	1480	1615
kVA	Start ($\Delta U = 20\%$ cont. or 30% trans.) AREP	1269	1443	1490	1486	1805	1968
%	Transient ΔU (on-load 4/4) SHUNT - P.F.: 0.8 _{LAG}	12.8	10.3	15.5	14.3	15.7	12.1
%	Transient ΔU (on-load 4/4) AREP - P.F.: 0.8 _{LAG}	11	8.9	13.9	12.2	14.3	10.3
W	No-load losses	4011	5871	4911	4544	7414	6486
W	Heat dissipation	19374	20840	21557	25084	25152	26900

Transient voltage variation 400 V - 50 Hz



- 1) For a starting P.F. other than 0.6, the starting kVA must be multiplied by $K = \text{Sine P.F.} / 0.6$
- 2) For voltages other than 400V (Y), 230V (Δ) at 50 Hz, then kVA must be multiplied by $(400/U)^2$ or $(230/U)^2$.

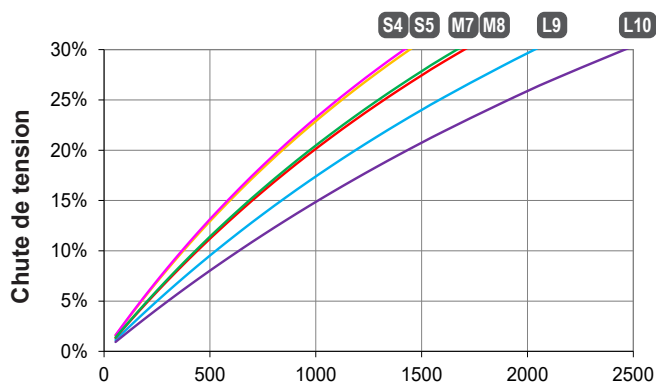
Efficiencies 480 V - 60 Hz (..... P.F.: 1) (— P.F.: 0.8)

Reactances (%). Time constants (ms) - Class H / 480 V

		S4	S5	M7	M8	L9	L10
Kcc	Short-circuit ratio	0.28	0.49	0.33	0.26	0.51	0.39
Xd	Direct-axis synchronous reactance unsaturated	417	315	382	452	309	361
Xq	Quadrature-axis synchronous reactance unsaturated	212	160	194	230	157	184
T'do	No-load transient time constant	2068	2030	1968	1931	1881	1857
X'd	Direct-axis transient reactance saturated	20.1	15.5	19.4	23.4	16.4	19.4
T'd	Short-circuit transient time constant	100	100	100	100	100	100
X''d	Direct-axis subtransient reactance saturated	11.5	8.9	11.1	13.4	9.4	11.1
T''d	Subtransient time constant	10	10	10	10	10	10
X''q	Quadrature-axis subtransient reactance saturated	13.1	10.5	14.2	17.8	13.2	15.9
Xo	Zero sequence reactance	0.84	0.64	0.8	0.97	0.68	0.81
X2	Negative sequence reactance saturated	12.35	9.75	12.68	15.64	11.33	13.58
Ta	Armature time constant	15	15	15	15	15	15

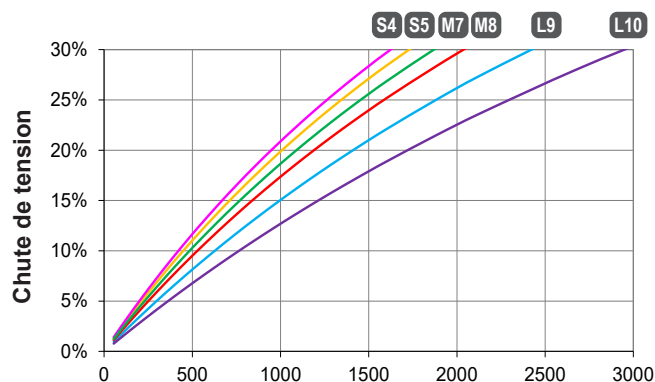
Other class H / 480 V data

io (A)	No-load excitation current (SHUNT / AREP)	0.68	1.07	0.79	0.68	1.11	0.91
ic (A)	On-load excitation current (SHUNT / AREP)	3.17	3.42	3.28	3.43	3.51	3.49
uc (V)	On-load excitation voltage (SHUNT / AREP)	33.2	35.8	34.3	35.8	36.6	36.3
ms	Response time ($\Delta U = 20\%$ transient)	500	500	500	500	500	500
kVA	Start ($\Delta U = 20\%$ cont. or 30% trans.) SHUNT	1268	1456	1495	1482	1849	2015
kVA	Start ($\Delta U = 20\%$ cont. or 30% trans.) AREP	1526	1791	1783	1780	2262	2460
%	Transient ΔU (on-load 4/4) SHUNT - P.F.: 0.8 _{LAG}	13.2	10.7	15.9	14.8	16.2	12.6
%	Transient ΔU (on-load 4/4) AREP - P.F.: 0.8 _{LAG}	11.3	9.2	14.2	12.7	14.7	10.7
W	No-load losses	6196	8711	7429	6931	10718	9520
W	Heat dissipation	23456	25534	26224	30403	30686	32721

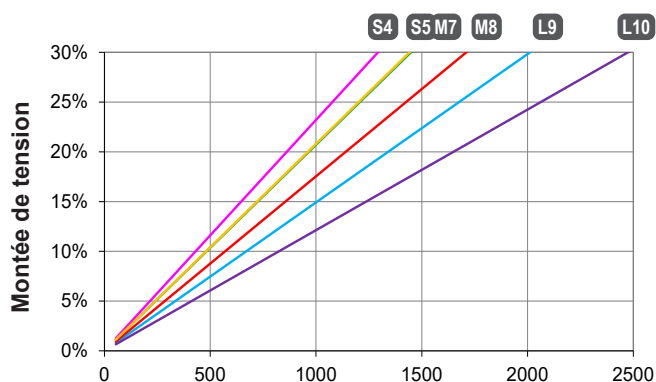
Transient voltage variation 480 V - 60 Hz



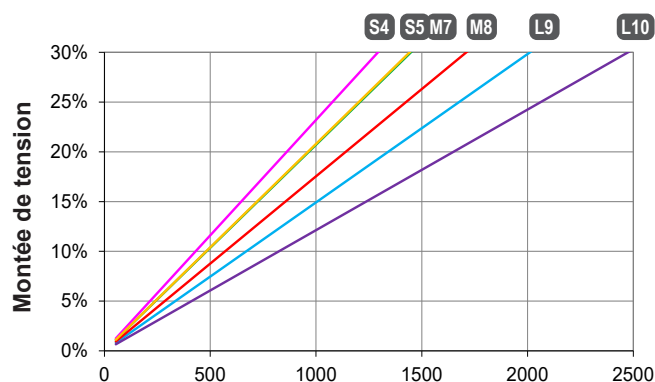
Mise en charge (SHUNT) - kVA à Cos Φ 0.8



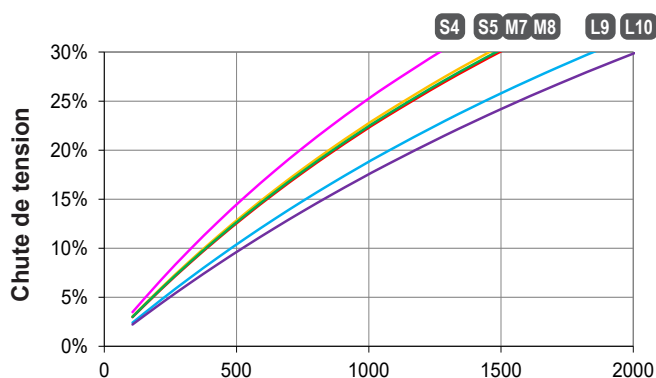
Mise en charge (AREP/PMG) - kVA à Cos Φ 0.8



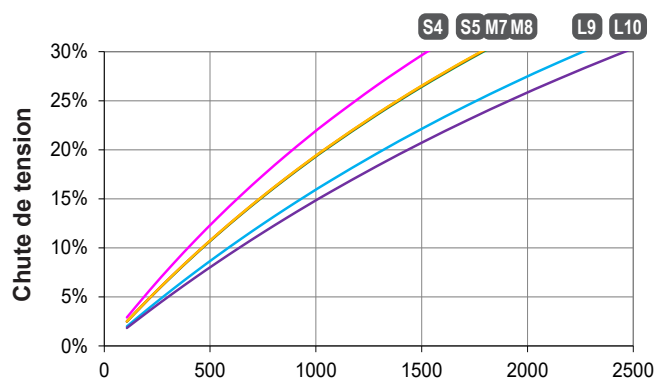
Délestage (SHUNT) - kVA à Cos Φ 0.8



Délestage (AREP/PMG) - kVA à Cos Φ 0.8



Démarrage des moteurs (SHUNT)
kVA rotor bloqué à Cos Φ 0.6



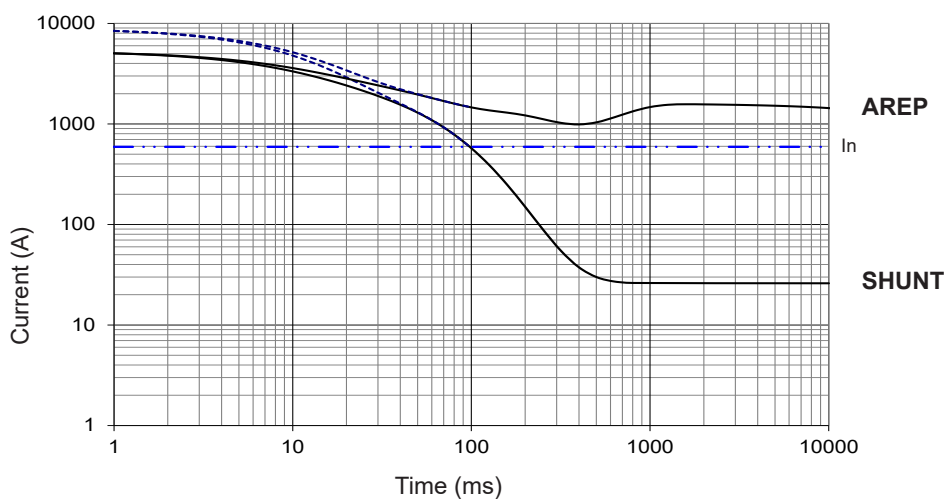
Démarrage des moteurs (AREP/PMG)
kVA rotor bloqué à Cos Φ 0.6

- 1) For a starting P.F. other than 0.6, the starting kVA must be multiplied by $K = \text{Sine P.F.} / 0.6$
- 2) For voltages other than 480V (Y), 277V (Δ), 240V (YY) at 60 Hz, then kVA must be multiplied by $(480/U)^2$ or $(277/U)^2$ or $(240/U)^2$.

3-phase short-circuit curves at no load and rated speed (star connection Y)

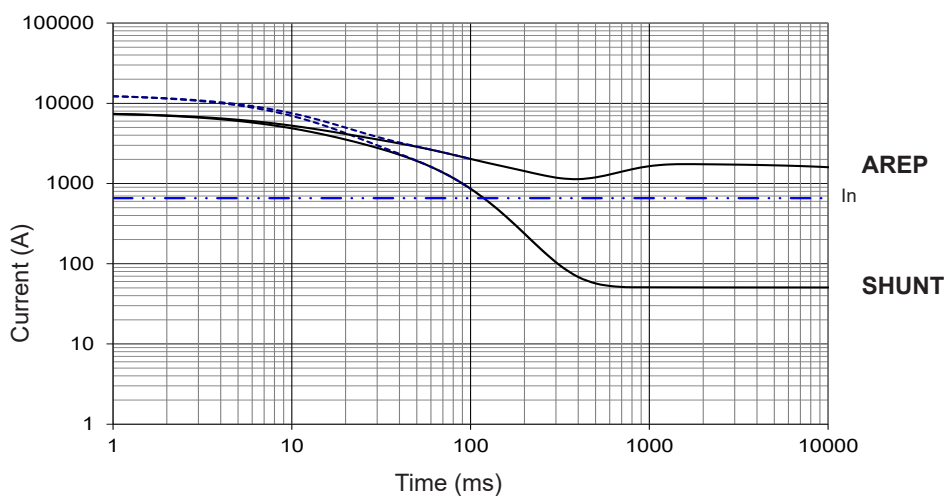
LSA 47.3 S4

Symmetrical —
Asymmetrical - - -



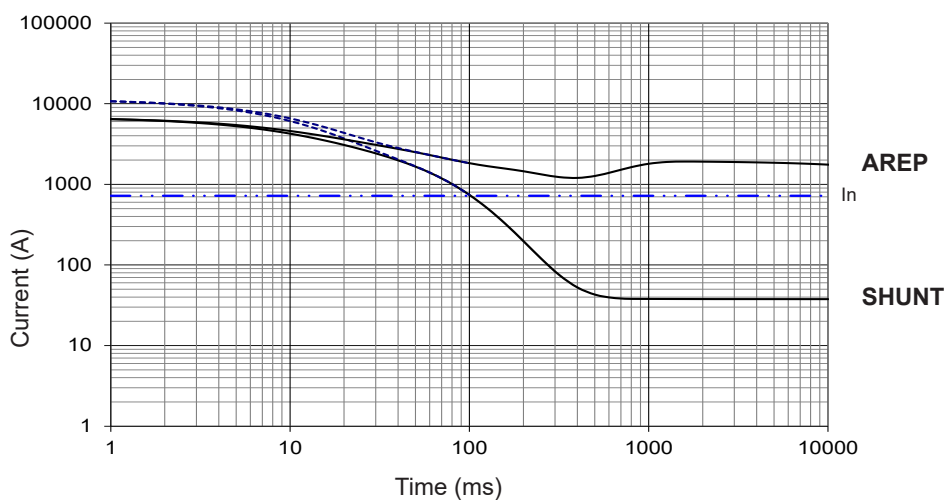
LSA 47.3 S5

Symmetrical —
Asymmetrical - - -



LSA 47.3 M7

Symmetrical —
Asymmetrical - - -



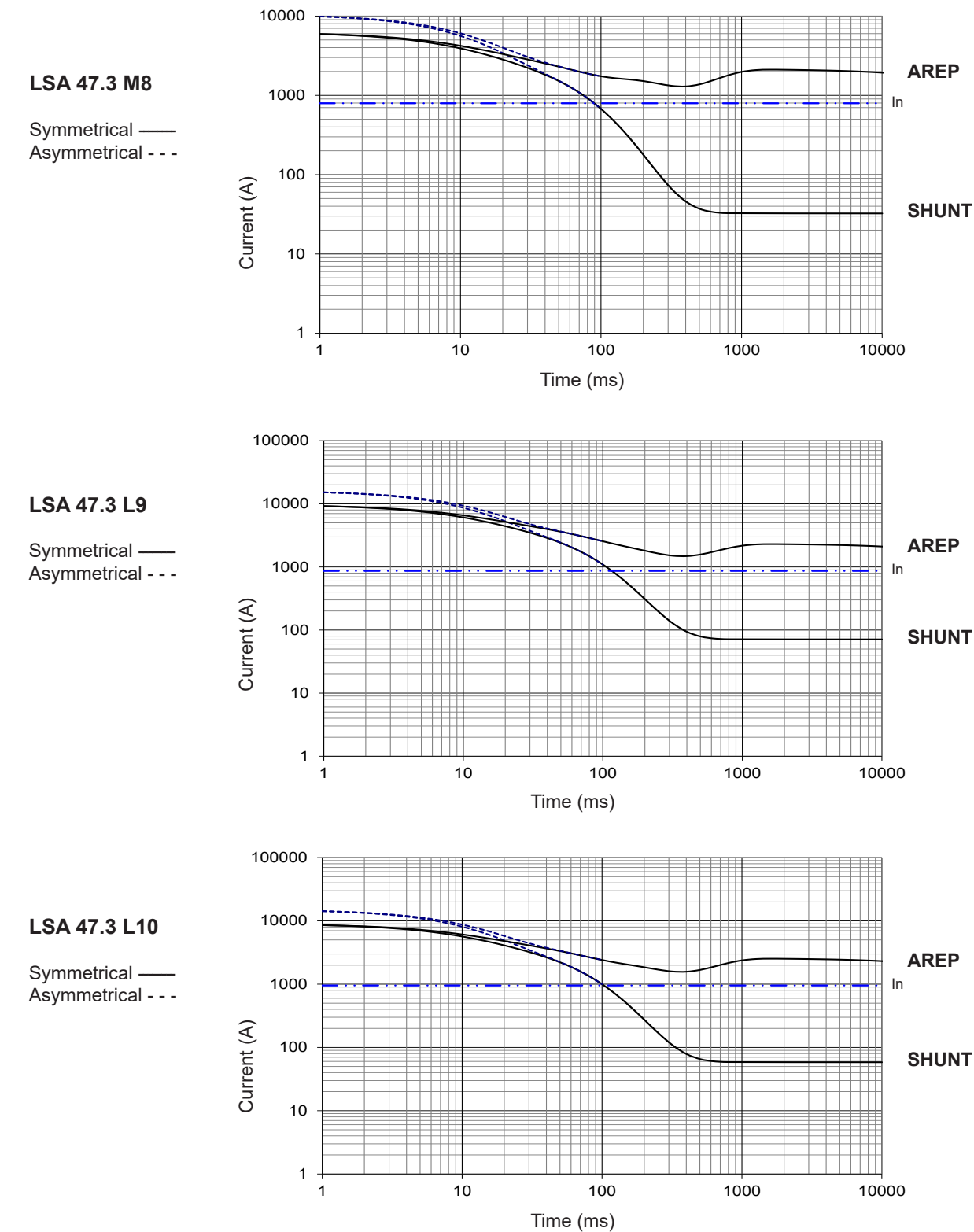
Influence due to connection

Curves shown are for star (Y) connection.

For other connections, use the following multiplication factors:

- Series delta : current value x 1.732 - Parallel star : current value x 2

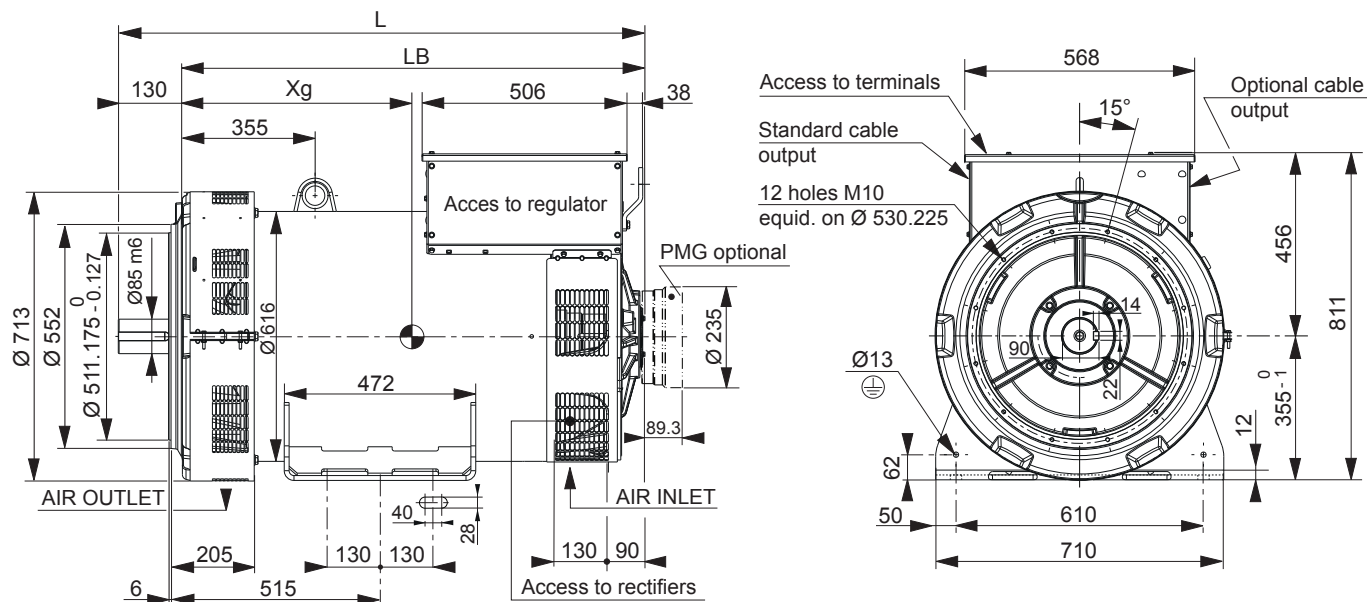
3-phase short-circuit curves at no load and rated speed (star connection Y)



Influence due to short-circuit
Curves are based on a three-phase short-circuit.
For other types of short-circuit, use the following multiplication factors.

	3-phase	2-phase L/L	1-phase L/N
Instantaneous (max.)	1	0.87	1.3
Continuous	1	1.5	2.2
Maximum duration (AREP/PMG)	10 sec.	5 sec.	2 sec.

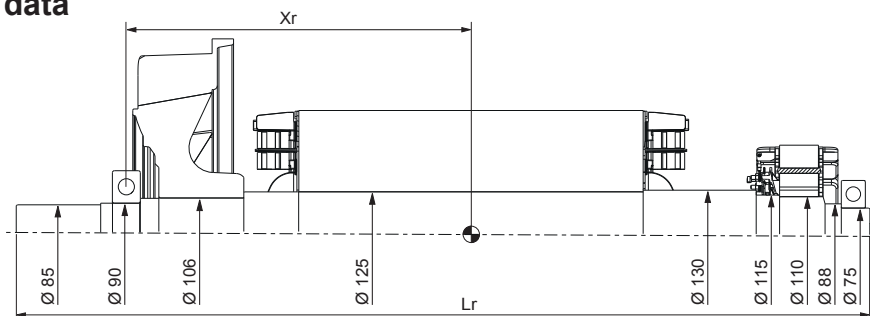
Two-bearing dimensions



Dimensions (mm) and weight

Type	L without PMG	LB	Xg	Weight (kg)
LSA 47.3 S4	1211	1081	499	1130
LSA 47.3 S5	1211	1081	505	1162
LSA 47.3 M7	1311	1181	535	1250
LSA 47.3 M8	1311	1181	665	1304
LSA 47.3 L9	1331	1201	563	1386
LSA 47.3 L10	1331	1201	572	1434

Torsional analysis data



Centre of gravity: Xr (mm), Rotor length: Lr (mm), Weight: M (kg), Moment of inertia: J (kgm²): (4J = MD²)

Type	Xr	Lr	M	J
LSA 47.3 S4	430	1195	422	6.80
LSA 47.3 S5	437	1195	435	7.03
LSA 47.3 M7	466	1295	470	7.51
LSA 47.3 M8	477	1295	496	8
LSA 47.3 L9	497	1315	524	8.46
LSA 47.3 L10	508	1315	542	8.81

NOTE : Dimensions are for information only and may be subject to modifications. Contractual 2D drawings can be downloaded from the Leroy-Somer site, 3D drawing files are available upon request.
The torsional analysis of the transmission is imperative. All values are available upon request.

LEROY-SOMERTM

www.leroy-somer.com/epg

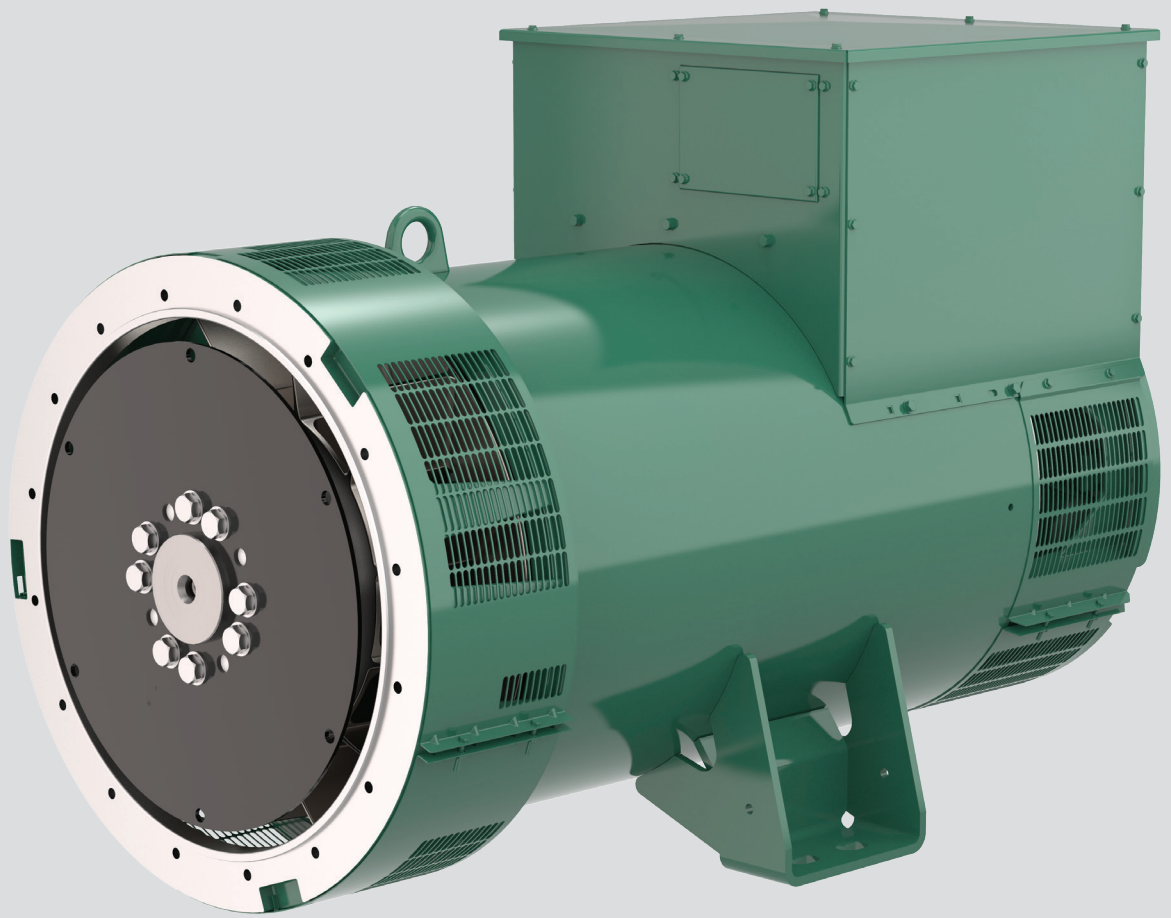
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Nidec
All for dreams

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Moteurs Leroy-Somer SAS. Siège : Bd Marcellin Leroy, CS 10015, 16915 Angoulême Cedex 9, France.
Capital social : 38 679 664 €, RCS Angoulême 338 567 258.



LSA 49.3

Low Voltage Alternator - 4 pole

660 to 1000 kVA - 50 Hz / 825 to 1250 kVA - 60 Hz
Electrical and mechanical data

LEROY-SOMER™

Nidec
All for dreams

The best of performance

Nidec Leroy-Somer LSA 49.3 alternator has been designed to offer you the best power generation performances. With its meticulous design and optimized architecture, the LSA 49.3 strikes the perfect balance between compactness, reliability, performance and longevity.

Whatever your application, the LSA 49.3 will meet your needs and will adapt to all situations.

Standards

Nidec Leroy-Somer LSA 49.3 alternator meets all key international standards and regulations, including IEC 60034, NEMA MG 1.32-33, ISO 8528-3, CSA C22.2 n°100-14 and UL 1446 (UL 1004 on request). Also compliant with IEC 61000-6-2, IEC 61000-6-3, IEC 61000-6-4, VDE 0875G, VDE 0875N and EN 55011, group 1 class A for European zone. Nidec Leroy-Somer LSA 49.3 alternator can be integrated in EC marked generator set, and bears EC, EAC and CMIM markings. It is designed, manufactured and marketed in an ISO 9001 and ISO 14001 quality assurance environment.

Electrical characteristics and performances

- Class H insulation
- 2/3 pitch winding, standard 6-wire (6S) reconnectable or 12-wire (6) optional
- Voltage range:
 - 50 Hz: 220V - 240V and 380V - 415V (440V)
 - 60 Hz: 208V - 240V and 380V - 480V
- High efficiency and motor starting capacity
- Other voltages are possible with optional adapted windings:
 - 50 Hz: 440V (no. 7), 500V (no. 9), 550V (no. 22), 600V (no. 23), 690V (no. 10)
 - 60 Hz: 380V and 416V (no. 8), 600V (no. 9), 690V (no. 22)

Excitation and regulation system

Excitation system			Regulation options		
AVR	AREP	PMG (option)	C.T. Current transformer for paralleling	Mains paralleling	Remote voltage potentiometer
D350	Standard	Standard	√		√
D550	Option	Option	√	√	√

3-phase sensing is included as a standard with digital regulators.

Protection system and options

- The LSA 49.3 is IP 23
- Complete winding protection for clean environments with relative humidity $\leq 95\%$, including indoor marine environments
- Options:
 - Filters on air inlet: derating 5%
 - Filters on air inlet and air outlet (IP 44): derating 10%
 - Reinforced winding protection for harsh environments and relative humidity greater than 95%
 - Space heater
 - Thermal protection for stator windings and shields

Mechanical construction

- Compact and rigid assembly to better withstand generator vibrations
- Steel frame
- Cast iron flanges and shields
- Two-bearing and single-bearing versions designed to be suitable for engines on the market
- Half-key balancing
- Greased for life bearings, regreasable bearings (optional)
- Standard direction of rotation: clockwise when looking at the drive end view (for anti-clockwise, derate the machine by 5%)

Terminal box design

- Easy access to the voltage regulator and to the connections
- Possible inclusion of accessories for paralleling, protection and measurement
- Connection bars for voltage reconnection

General characteristics

Insulation class	H	Excitation system	AREP / PMG
Winding pitch	2/3 (wind.6S - 6-wire / wind.6 - 12-wire option)	AVR type	D350
Number of wires	6 (12 option)	Voltage regulation (*)	± 0.25%
Protection	IP 23	Short-circuit current	300% (3 IN) : 10s
Altitude	≤ 1000 m	Total Harmonic distortion THD (**) at no load < 4% - on load < 4%	
Overspeed	2250 R.P.M.	Waveform: NEMA = TIF (**) < 50	
Air flow	1 m³/s (50 Hz) / 1.2 m³/s (60 Hz)	Waveform: IEC = THF (**) < 2%	

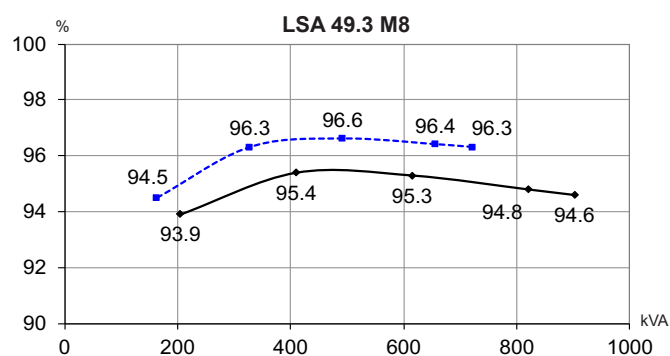
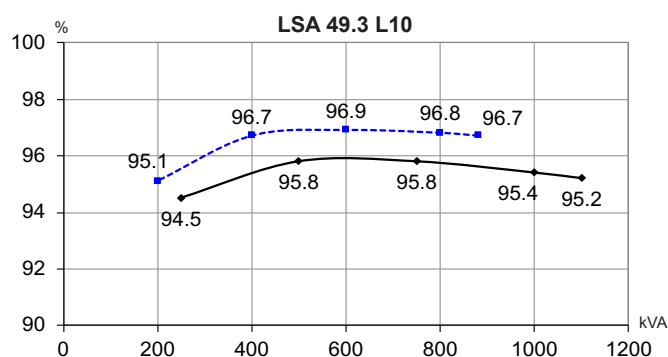
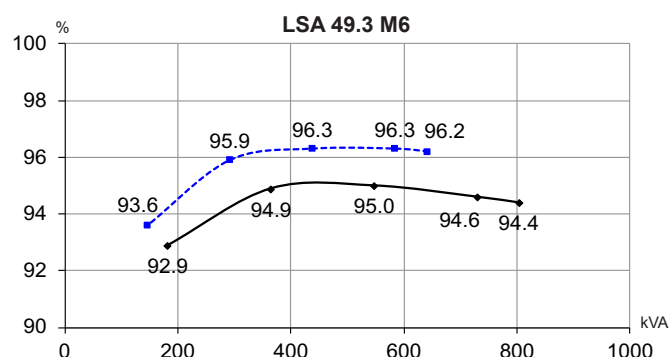
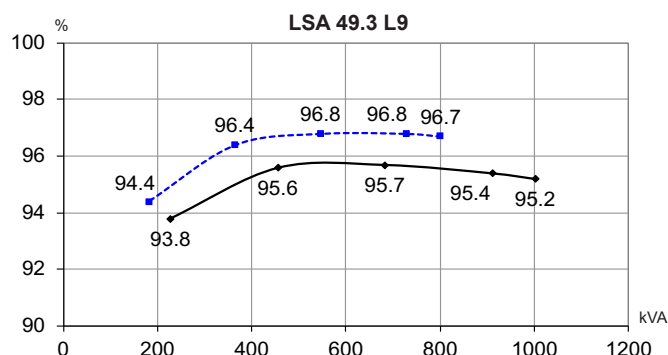
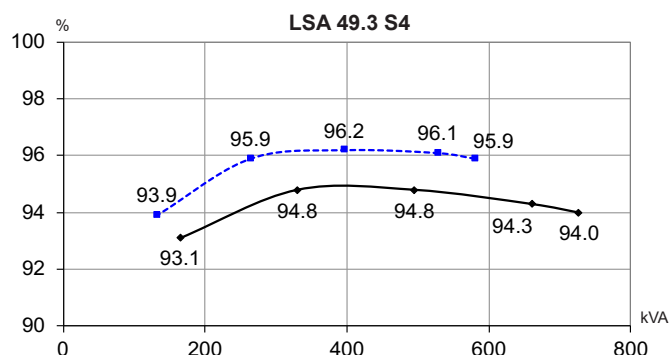
(*) Steady state (**) Total harmonic distortion between phases, no-load or on-load (non-distorting)

Ratings 50 Hz - 1500 R.P.M.

kVA / kW - P.F. = 0.8																	
Duty/T°C		Continuous duty/40°C				Continuous duty/40°C				Stand-by/40°C				Stand-by/27°C			
Class/T°K		H/125°K				F/105°K				H/150°K				H/163°K			
Phase		3 ph.				3 ph.				3 ph.				3 ph.			
Y		380V	400V	415V	440V	380V	400V	415V	440V	380V	400V	415V	440V	380V	400V	415V	440V
Δ		220V	230V	240V		220V	230V	240V		220V	230V	240V		220V	230V	240V	
YY			200V		220V		200V		220V		200V		220V		200V		220V
LSA 49.3 S4	kVA	660	660	660	620	595	595	595	560	725	725	725	685	745	745	745	715
	kW	528	528	528	496	476	476	476	448	580	580	580	548	596	596	596	572
LSA 49.3 M6	kVA	730	730	730	665	660	660	660	600	780	780	780	730	810	810	810	765
	kW	584	584	584	532	528	528	528	480	624	624	624	584	648	648	648	612
LSA 49.3 M8	kVA	820	820	820	810	760	760	760	710	910	910	910	885	945	945	945	925
	kW	656	656	656	648	608	608	608	568	728	728	728	708	756	756	756	740
LSA 49.3 L9	kVA	910	910	910	820	820	820	820	740	1000	1000	1000	920	1020	1020	1020	965
	kW	728	728	728	656	656	656	656	592	800	800	800	736	816	816	816	772
LSA 49.3 L10	kVA	1000	1000	1000	950	900	900	900	840	1085	1085	1085	1030	1130	1130	1130	1080
	kW	800	800	800	760	720	720	720	672	868	868	868	824	904	904	904	864

Ratings 60 Hz - 1800 R.P.M.

kVA / kW - P.F. = 0.8																	
Duty/T°C		Continuous duty/40°C				Continuous duty/40°C				Stand-by/40°C				Stand-by/27°C			
Class/T°K		H/125°K				F/105°K				H/150°K				H/163°K			
Phase		3 ph.				3 ph.				3 ph.				3 ph.			
Y		380V	416V	440V	480V	380V	416V	440V	480V	380V	416V	440V	480V	380V	416V	440V	480V
Δ		220V	240V			220V	240V			220V	240V			220V	240V		
YY			208V	220V	240V		208V	220V	240V		208V	220V	240V		208V	220V	240V
LSA 49.3 S4	kVA	653	715	756	825	588	644	681	743	693	758	802	875	718	787	832	908
	kW	522	572	605	660	470	515	545	594	554	606	642	700	574	630	666	726
LSA 49.3 M6	kVA	725	795	840	915	655	715	760	825	770	845	890	970	800	875	925	1005
	kW	580	636	672	732	524	572	608	660	616	676	712	776	640	700	740	804
LSA 49.3 M8	kVA	815	890	940	1025	735	805	850	925	865	945	1000	1090	895	980	1040	1130
	kW	652	712	752	820	588	644	680	740	692	756	800	872	716	784	832	904
LSA 49.3 L9	kVA	905	990	1045	1140	815	895	940	1025	960	1050	1110	1210	1000	1090	1155	1255
	kW	724	792	836	912	652	716	752	820	768	840	888	968	800	872	924	1004
LSA 49.3 L10	kVA	990	1083	1146	1250	891	975	1031	1125	1049	1148	1215	1325	1089	1192	1260	1375
	kW	792	866	917	1000	713	780	825	900	839	918	972	1060	871	954	1008	1100

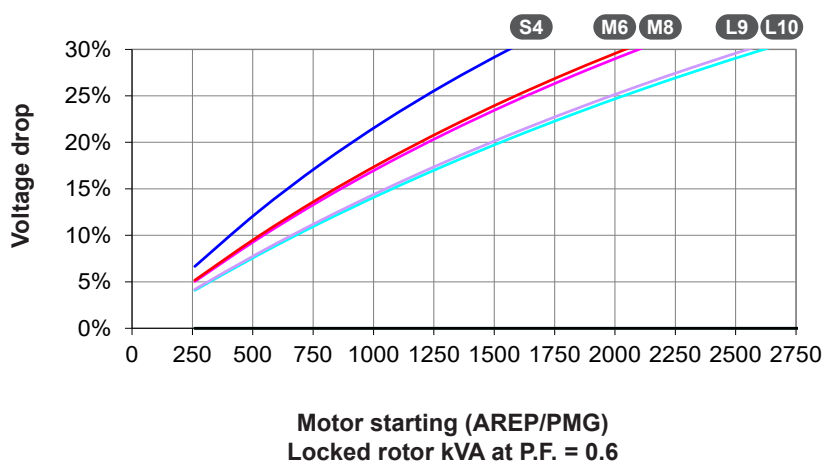
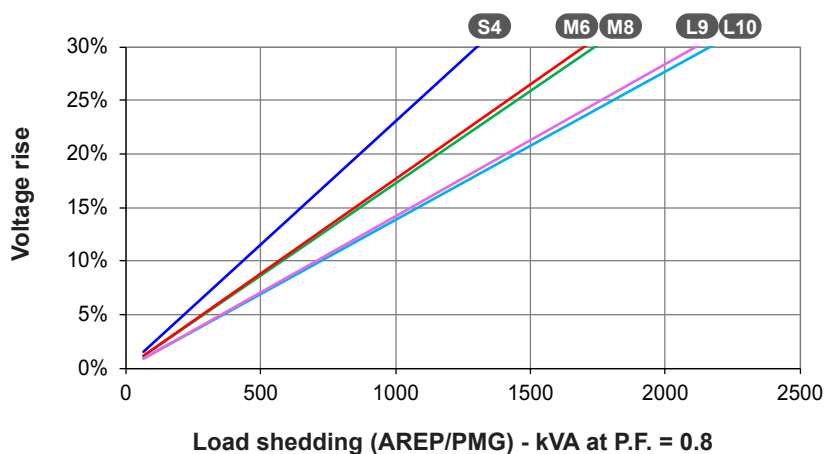
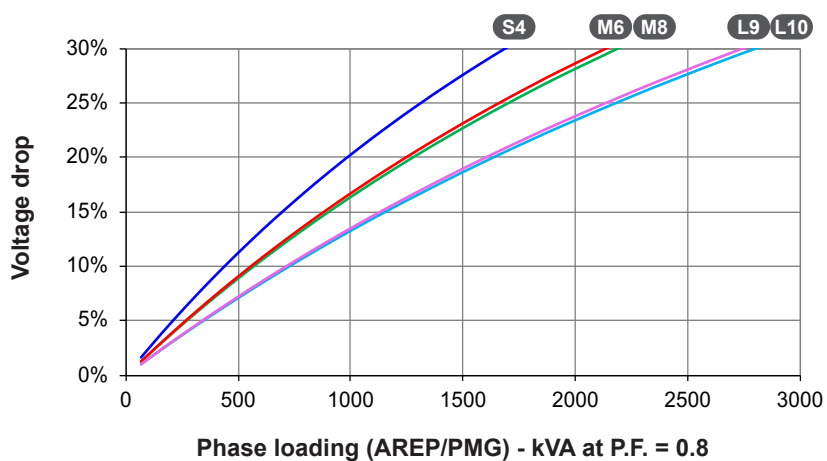
Efficiencies 400V - 50 Hz (..... P.F.: 1) (— P.F.: 0.8)

Reactances (%). Time constants (ms) - Class H / 400 V

	S4	M6	M8	L9	L10
Kcc Short-circuit ratio	0.33	0.42	0.34	0.41	0.34
Xd Direct-axis synchronous reactance unsaturated	350	294	348	303	348
Xq Quadrature-axis synchronous reactance unsaturated	178	150	177	154	177
T'do No-load transient time constant	2002	2074	2094	2138	2153
X'd Direct-axis transient reactance saturated	17.5	14.2	16.6	14.1	16.1
T'd Short-circuit transient time constant	100	100	100	100	100
X''d Direct-axis subtransient reactance saturated	14	11.3	13.3	11.3	12.9
T''d Subtransient time constant	10	10	10	10	10
X''q Quadrature-axis subtransient reactance saturated	16.3	12.8	14.9	12.4	14.1
Xo Zero sequence reactance	0.72	0.59	0.69	0.59	0.67
X2 Negative sequence reactance saturated	15.17	12.1	14.11	11.92	13.53
Ta Armature time constant	15	15	15	15	15

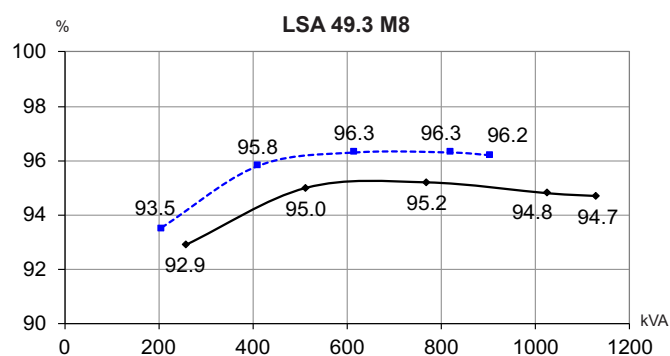
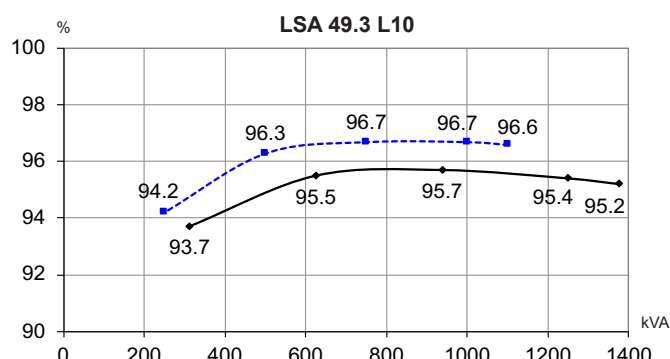
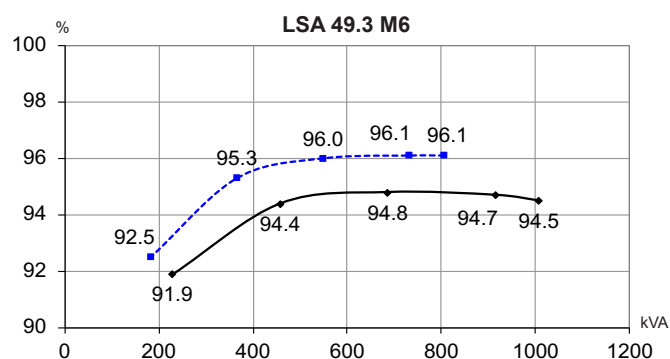
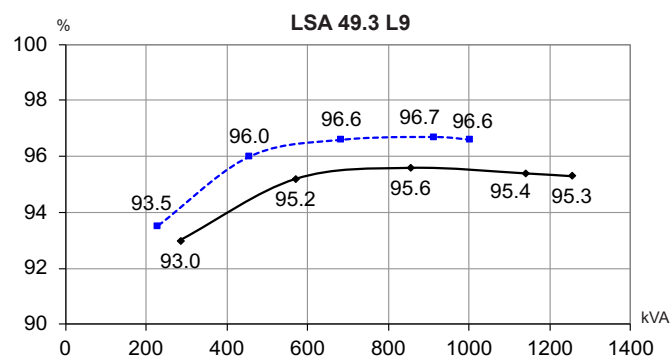
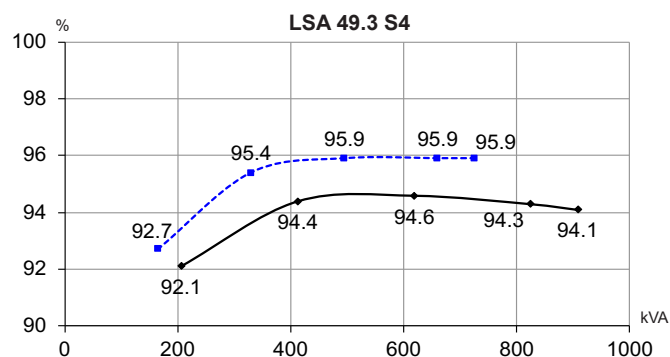
Other class H / 400 V data

io (A) No-load excitation current	0.99	1.11	0.87	0.99	0.9
ic (A) On-load excitation current	4.04	3.8	3.52	3.46	3.62
uc (V) On-load excitation voltage	46	43.2	39.9	39.1	40.9
ms Response time ($\Delta U = 20\%$ transient)	500	500	500	500	500
kVA Start ($\Delta U = 20\%$ cont. or 30% trans.)	1560	2050	2050	2600	2600
% Transient ΔU (on-load 4/4) - P.F.: 0.8 _{LAG}	14.4	12.6	14.2	12.2	13.6
W No-load losses	7968	9374	8753	10104	9556
W Heat dissipation	31765	32819	35599	34562	38447

Transient voltage variation 400V - 50 Hz



- 1) For a starting P.F. other than 0.6, the starting kVA must be multiplied by $K = \text{Sine P.F.} / 0.8$
- 2) For voltages other than 400V (Y), 230V(Δ) at 50 Hz, then kVA must be multiplied by $(400/U)^2$ or $(230/U)^2$.

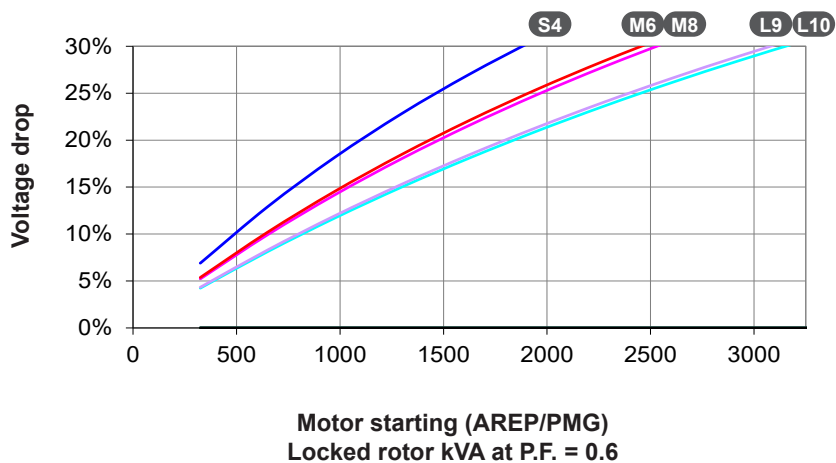
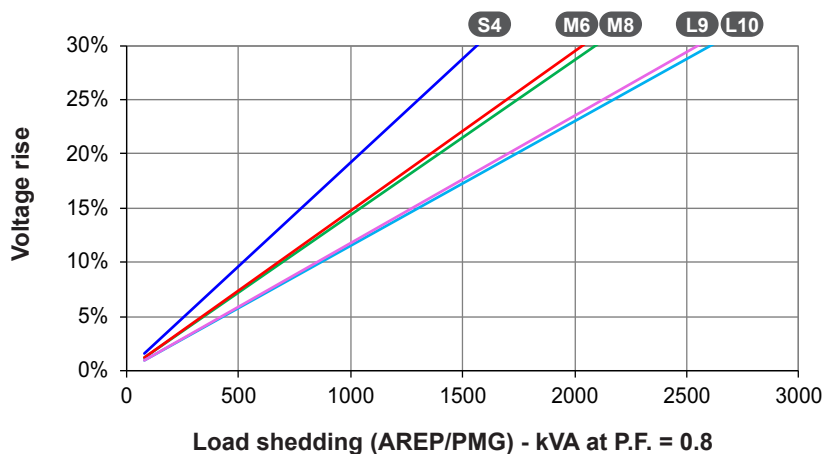
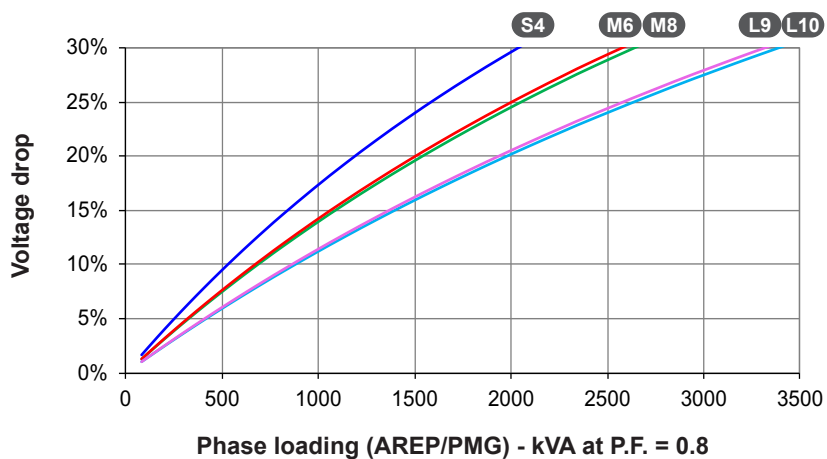
Efficiencies 480V - 60 Hz (..... P.F.: 1) (— P.F.: 0.8)

Reactances (%). Time constants (ms) - Class H / 480 V

	S4	M6	M8	L9	L10
Kcc Short-circuit ratio	0.32	0.4	0.32	0.4	0.33
Xd Direct-axis synchronous reactance unsaturated	365	307	362	317	363
Xq Quadrature-axis synchronous reactance unsaturated	186	156	185	161	185
T'do No-load transient time constant	2002	2074	2094	2138	2153
X'd Direct-axis transient reactance saturated	18.2	14.8	17.3	14.8	16.8
T'd Short-circuit transient time constant	100	100	100	100	100
X''d Direct-axis subtransient reactance saturated	14.5	11.8	13.8	11.8	13.4
T''d Subtransient time constant	10	10	10	10	10
X''q Quadrature-axis subtransient reactance saturated	17	13.4	15.5	13	14.7
Xo Zero sequence reactance	0.76	0.61	0.72	0.61	0.7
X2 Negative sequence reactance saturated	15.8	12.64	14.7	12.44	14.1
Ta Armature time constant	15	15	15	15	15

Other class H / 480 V data

io (A) No-load excitation current	0.99	1.11	0.87	0.99	0.9
ic (A) On-load excitation current	4.14	3.89	3.6	3.53	3.69
uc (V) On-load excitation voltage	47.3	44.4	41	40.2	41.9
ms Response time ($\Delta U = 20\%$ transient)	500	500	500	500	500
kVA Start ($\Delta U = 20\%$ cont. or 30% trans.)	1950	2565	2565	3250	3250
% Transient ΔU (on-load 4/4) - P.F.: 0.8 _{LAG}	14.9	13	14.7	12.7	14
W No-load losses	12441	14387	13586	15384	14640
W Heat dissipation	39236	40967	44074	43239	47530

Transient voltage variation 480V - 60 Hz

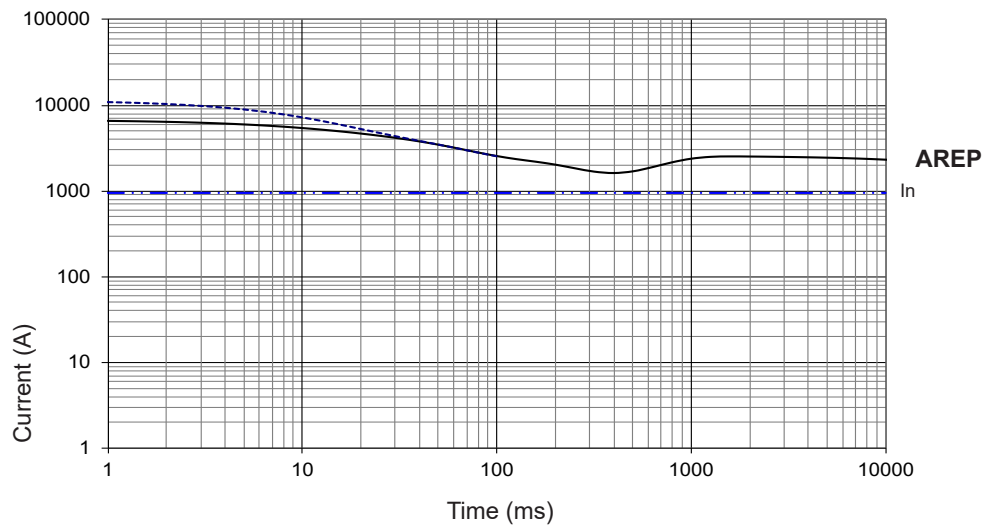


- 1) For a starting P.F. other than 0.6, the starting kVA must be multiplied by $K = \text{Sine P.F.} / 0.8$
- 2) For voltages other than 480V (Y), 277V (Δ), 240V (YY) at 60 Hz, then kVA must be multiplied by $(480/U)^2$ or $(277/U)^2$ or $(240/U)^2$.

3-phase short-circuit curves at no load and rated speed (star connection Y)

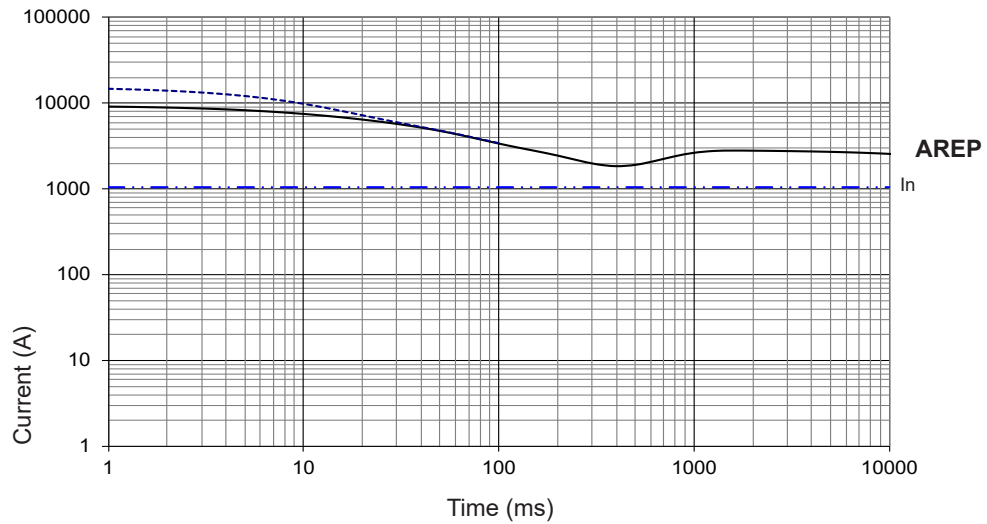
LSA 49.3 S4

Symmetrical —
Asymmetrical - - -



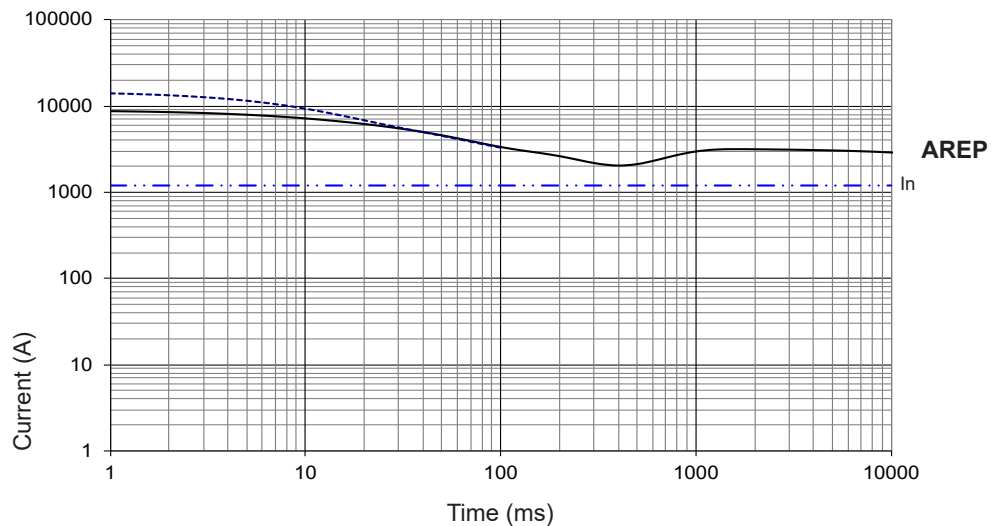
LSA 49.3 M6

Symmetrical —
Asymmetrical - - -



LSA 49.3 M8

Symmetrical —
Asymmetrical - - -



Influence due to connection

Curves shown are for star (Y) connection.

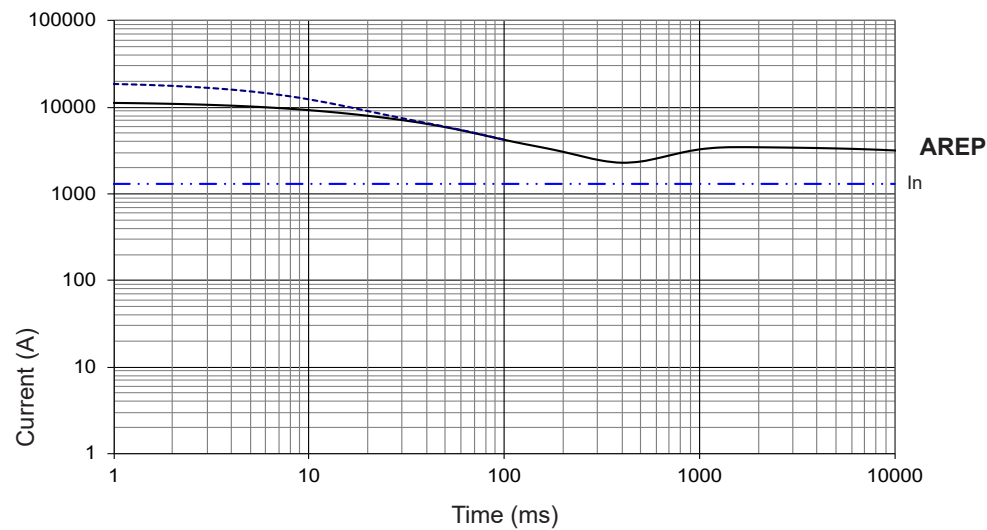
For other connections, use the following multiplication factors:

- Series delta : current value x 1.732 - Parallel star : current value x 2

3-phase short-circuit curves at no load and rated speed (star connection Y)

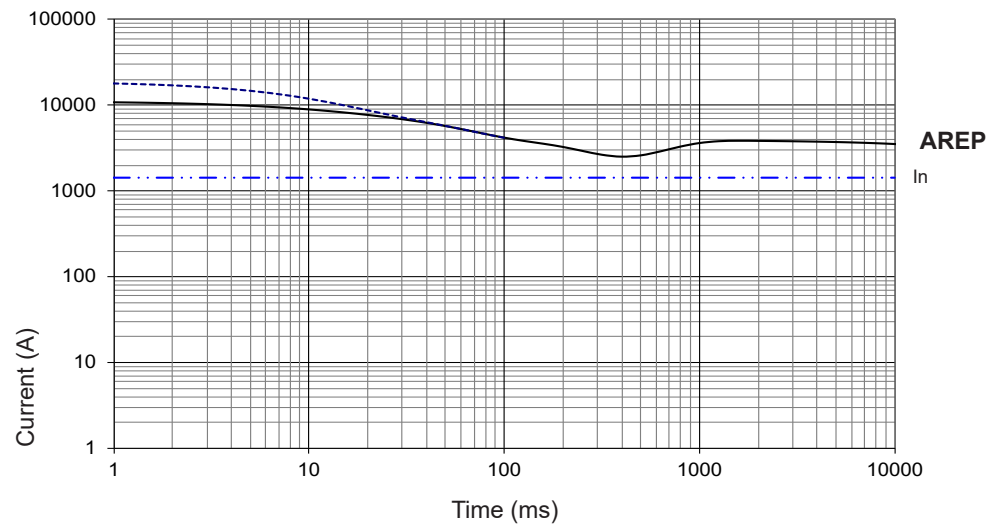
LSA 49.3 L9

Symmetrical —
Asymmetrical - - -



LSA 49.3 L10

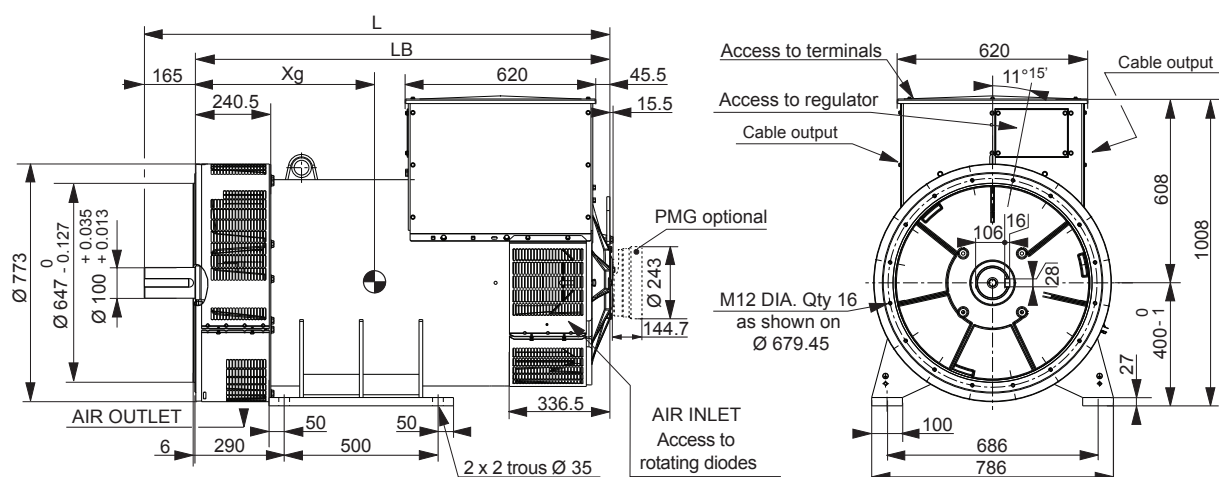
Symmetrical —
Asymmetrical - - -



Influence due to short-circuit
Curves are based on a three-phase short-circuit.
For other types of short-circuit, use the following multiplication factors.

	3-phase	2-phase L/L	1-phase L/N
Instantaneous (max.)	1	0.87	1.3
Continuous	1	1.5	2.2
Maximum duration (AREP/PMG)	10 sec.	5 sec.	2 sec.

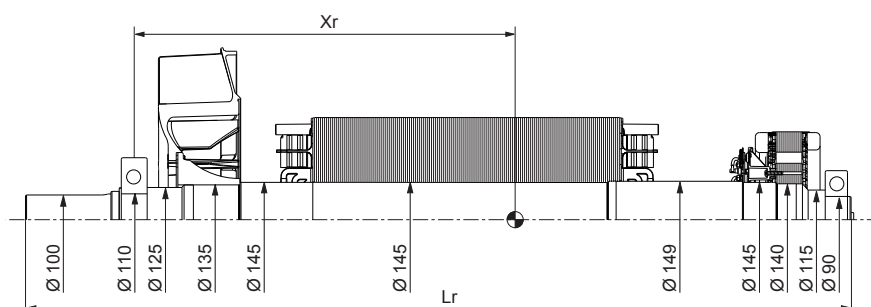
Two-bearing dimensions



Dimensions (mm) and weight

Type	L without PMG	LB	Xg	Weight (kg)
LSA 49.3 S4	1424	1259	596	1480
LSA 49.3 M6	1514	1349	636	1622
LSA 49.3 M8	1514	1349	643	1683
LSA 49.3 L9	1604	1439	682	1835
LSA 49.3 L10	1604	1439	688	1884

Torsional analysis data



Centre of gravity: Xr (mm), Rotor length: Lr (mm), Weight: M (kg), Moment of inertia: J (kgm²): (4J = MD²)

Type	Xr	Lr	M	J
LSA 49.3 S4	545	1409	512	8.07
LSA 49.3 M6	584	1499	574	9.18
LSA 49.3 M8	590	1499	600	9.73
LSA 49.3 L9	627	1589	656	10.69
LSA 49.3 L10	634	1589	673	11.05

NOTE : Dimensions are for information only and may be subject to modifications. Contractual 2D drawings can be downloaded from the Leroy-Somer site, 3D drawing files are available upon request.
The torsional analysis of the transmission is imperative. All values are available upon request.

LEROY-SOMERTM

www.leroy-somer.com/epg

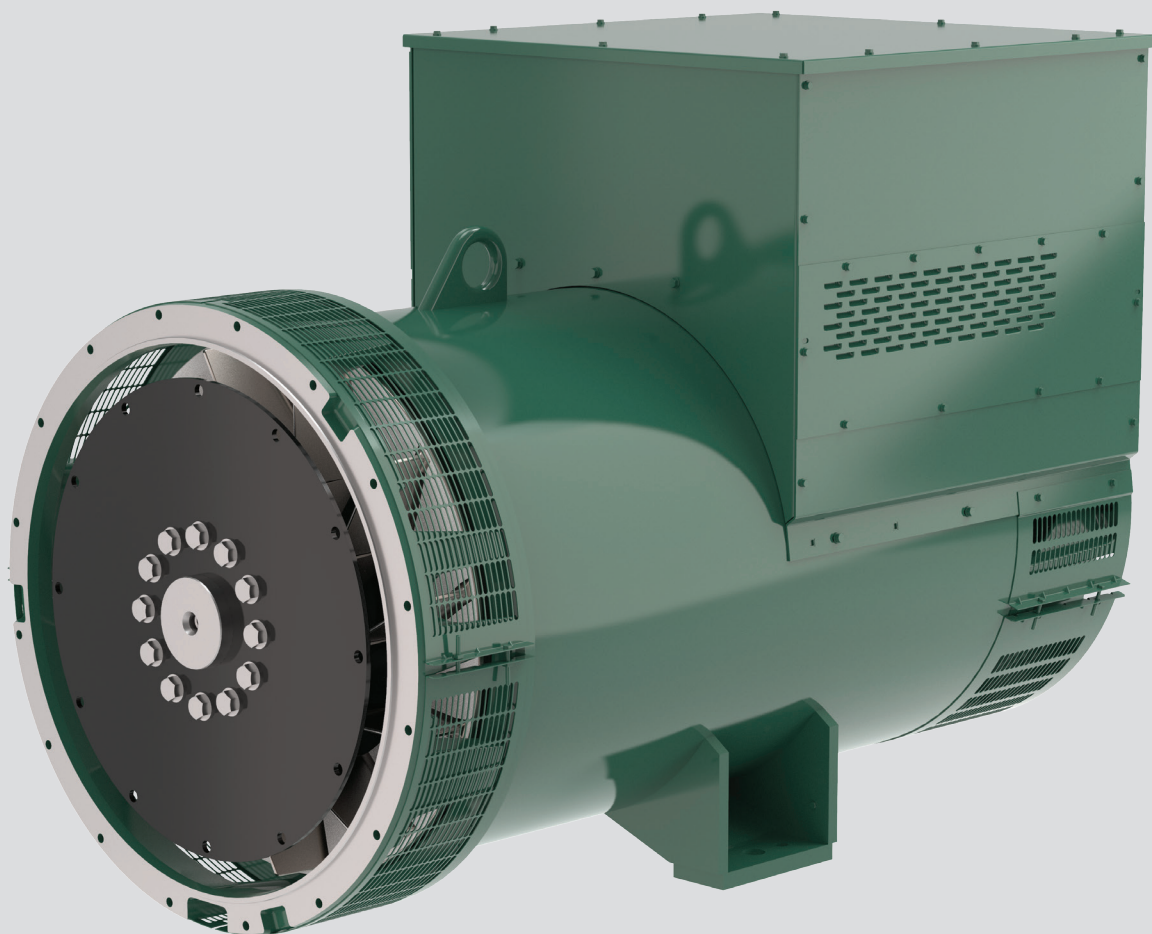
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Nidec
All for dreams

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Moteurs Leroy-Somer SAS. Siège : Bd Marcellin Leroy, CS 10015, 16915 Angoulême Cedex 9, France.
Capital social : 38 679 664 €, RCS Angoulême 338 567 258.



LSA 50.2

Low Voltage Alternator - 4 pole

1100 to 1640 kVA - 50 Hz / 1250 to 2000 kVA - 60 Hz

Electrical and mechanical data

LEROY-SOMER™

Nidec
All for dreams

The best of performance

Nidec Leroy-Somer LSA 50.2 alternator has been designed to offer you the best power generation performances. With its meticulous design and optimized architecture, the LSA 50.2 strikes the perfect balance between compactness, reliability, performance and longevity.

Whatever your application, the LSA 50.2 will meet your needs and will adapt to all situations.

Standards

Nidec Leroy-Somer LSA 50.2 alternator meets all key international standards and regulations, including IEC 60034, NEMA MG 1.32-33, ISO 8528-3, CSA C22.2 n°100-14 and UL 1446 (UL 1004 on request). Also compliant with IEC 61000-6-2, IEC 61000-6-3, IEC 61000-6-4, VDE 0875G, VDE 0875N and EN 55011, group 1 class A for European zone.

Nidec Leroy-Somer LSA 50.2 alternator can be integrated in EC marked generator set, and bears EC, EAC and CMIM markings. It is designed, manufactured and marketed in an ISO 9001 and ISO 14001 quality assurance environment.

Electrical characteristics and performances

- Class H insulation
- 2/3 pitch winding, standard 6-wire (6S) reconnectable or 12-wire (6) optional
- Voltage range:
 - 50 Hz: 220V - 240V and 380V - 415V (440V)
 - 60 Hz: 208V - 240V and 380V - 480V
- High efficiency and motor starting capacity
- Other voltages are possible with optional adapted windings:
 - 50 Hz: 440V (no. 7), 500V (no. 9), 550V (no. 22 or 23), 600V (no. 22 or 23), 690V (no. 52)
 - 60 Hz: 380V and 416V (no. 8), 600V (no. 9), 690V (no. 22 or 23)

Excitation and regulation system

Excitation system			Regulation options		
AVR	AREP	PMG (option)	C.T. Current transformer for paralleling	Mains paralleling	Remote voltage potentiometer
D350	Standard	Standard	√		√
D550	Option	Option	√	√	√

3-phase sensing is included as a standard with digital regulators.

Protection system and options

- The LSA 50.2 is IP 23
- Complete winding protection for clean environments with relative humidity $\leq 95\%$, including indoor marine environments
- Options:
 - Filters on air inlet: derating 5%
 - Filters on air inlet and air outlet (IP 44): derating 10%
 - Reinforced winding protection for harsh environments and relative humidity greater than 95%
 - Space heater
 - Thermal protection for stator windings and shields

Mechanical construction

- Compact and rigid assembly to better withstand generator vibrations
- Steel frame
- Cast iron flanges and shields
- Two-bearing and single-bearing versions designed to be suitable for engines on the market
- Half-key balancing
- Greased for life bearings, regreasable bearings (optional)
- Standard direction of rotation: clockwise when looking at the drive end view (for anti-clockwise, derate the machine by 5%)

Terminal box design

- Easy access to the voltage regulator and to the connections
- Possible inclusion of accessories for paralleling, protection and measurement
- Connection bars for voltage reconnection

LSA 50.2 - 1100 to 1640 kVA - 50 Hz / 1250 to 2000 kVA - 60 Hz

General characteristics

Insulation class	H	Excitation system	AREP / PMG
Winding pitch	2/3 (wind.6S - 6-wire / wind.6 - 12-wire option)	AVR type	D350
Number of wires	6 (12 option)	Voltage regulation (*)	± 0.25 %
Protection	IP 23	Short-circuit current	300% (3 IN) : 10s
Altitude	≤ 1000 m	Total Harmonic Distortion THD (**) in no-load	< 3.5 %
Overspeed	2250 R.P.M.	Total Harmonic Distortion THD (**) on linear load	< 3.5 %
Air flow	1.8 m³/s (50 Hz) / 2.2 m³/s (60 Hz)	Waveform: NEMA = TIF (**)	< 50

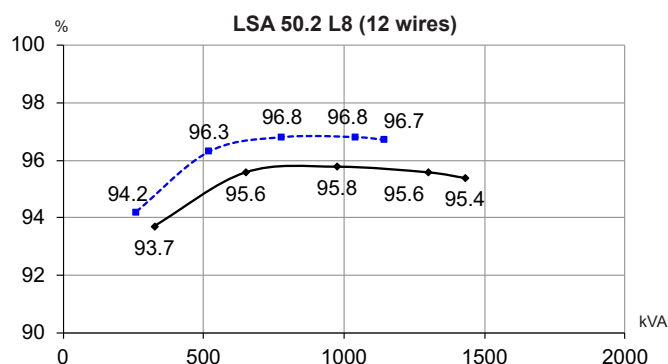
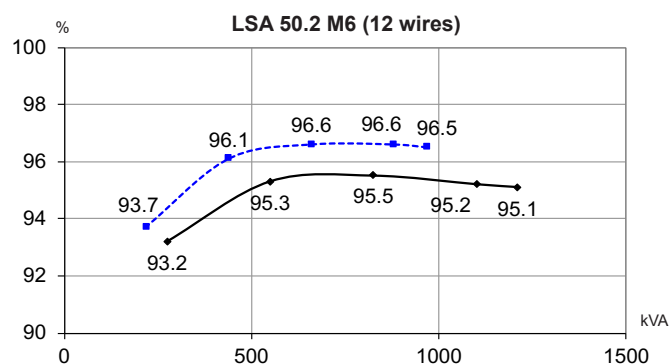
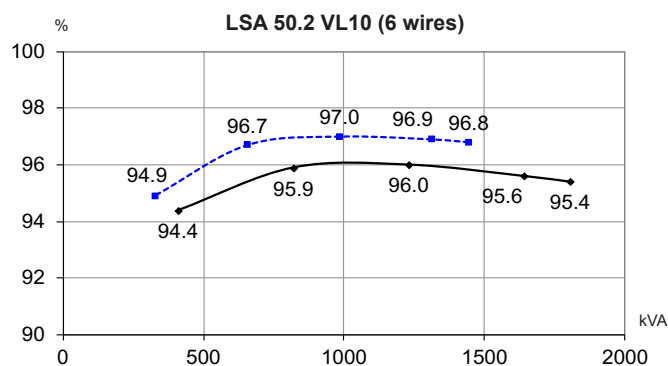
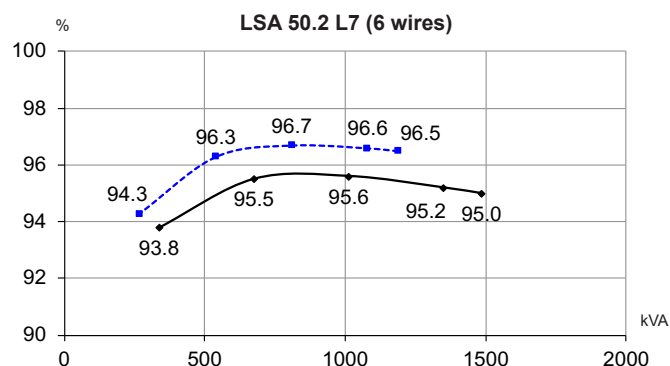
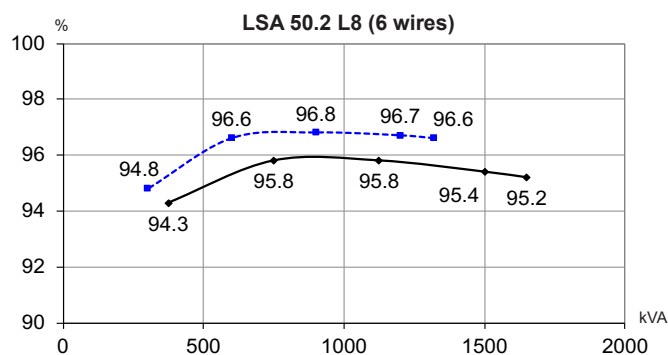
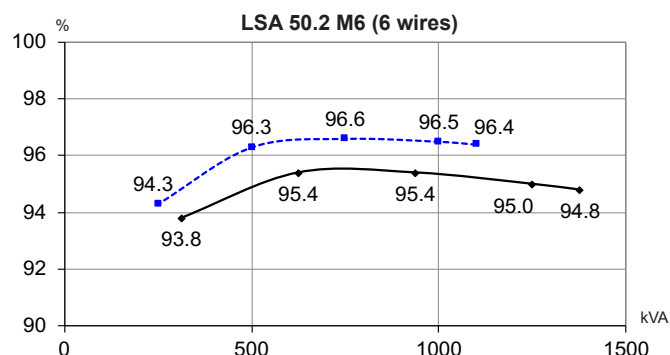
(*) Steady state (**) Total harmonic distortion between phases, no-load or on-load (non-distorting)

Ratings 50 Hz - 1500 R.P.M.

kVA / kW - P.F. = 0.8																				
Duty/T°C		Continuous duty/40°C					Continuous duty/40°C				Stand-by/40°C				Stand-by/27°C					
Class/T°K		H/125°K					F/105°K				H/150°K				H/163°K					
Phase		3 ph.					3 ph.				3 ph.				3 ph.					
Y		380V	400V	415V	440V		380V	400V	415V	440V		380V	400V	415V	440V		380V	400V	415V	440V
Δ		220V	230V	240V			220V	230V	240V			220V	230V	240V			220V	230V	240V	
6 wires version winding no. 6S																				
LSA 50.2 M6	kVA	1250	1250	1250	1190		1125	1125	1125	1095		1315	1315	1315	1275		1375	1375	1375	1330
	kW	1000	1000	1000	952		900	900	900	876		1052	1052	1052	1020		1100	1100	1100	1064
LSA 50.2 L7	kVA	1350	1350	1350	1260		1215	1215	1215	1150		1420	1420	1420	1365		1485	1485	1485	1425
	kW	1080	1080	1080	1008		972	972	972	920		1136	1136	1136	1092		1188	1188	1188	1140
LSA 50.2 L8	kVA	1450	1500	1500	1440		1320	1350	1350	1320		1520	1575	1575	1555		1595	1650	1650	1625
	kW	1160	1200	1200	1152		1056	1080	1080	1056		1216	1260	1260	1244		1276	1320	1320	1300
LSA 50.2 VL10	kVA	1600	1640	1600	1545		1455	1475	1455	1420		1680	1720	1680	1670		1760	1800	1760	1730
	kW	1280	1312	1280	1236		1164	1180	1164	1136		1344	1376	1344	1336		1408	1440	1408	1384
12 wires version winding no. 6 (option)																				
Y		380V	400V	415V	440V		380V	400V	415V	440V		380V	400V	415V	440V		380V	400V	415V	440V
Δ		220V	230V	240V			220V	230V	240V			220V	230V	240V			220V	230V	240V	
YY			200V		220V			200V		220V			200V		220V			200V		220V
LSA 50.2 M6	kVA	1045	1100	1140	1210		940	990	1026	1089		1045	1100	1140	1210		1045	1100	1140	1210
	kW	836	880	912	968		752	792	821	871		836	880	912	968		836	880	912	968
LSA 50.2 L8	kVA	1250	1300	1350	1430		1125	1170	1215	1287		1250	1300	1350	1430		1250	1300	1350	1430
	kW	1000	1040	1080	1144		900	936	972	1030		1000	1040	1080	1144		1000	1040	1080	1144

Ratings 60 Hz - 1800 R.P.M.

kVA / kW - P.F. = 0.8																	
Duty/T°C		Continuous duty/40°C				Continuous duty/40°C				Stand-by/40°C				Stand-by/27°C			
Class/T°C		H/125°K				F/105°K				H/150°K				H/163°K			
Phase		3 ph.				3 ph.				3 ph.				3 ph.			
Y		380V	416V	440V	480V	380V	416V	440V	480V	380V	416V	440V	480V	380V	416V	440V	480V
Δ		220V	240V			220V	240V			220V	240V			220V	240V		
6 wires version winding n°6S																	
LSA 50.2 M6	kVA	1285	1405	1455	1560	1155	1265	1310	1405	1350	1475	1530	1640	1410	1545	1600	1720
	kW	1028	1124	1164	1250	924	1012	1048	1124	1080	1180	1224	1312	1128	1236	1280	1376
LSA 50.2 L7	kVA	1375	1500	1555	1680	1240	1350	1400	1510	1440	1575	1630	1765	1510	1650	1710	1850
	kW	1100	1200	1244	1344	992	1080	1120	1208	1152	1260	1304	1412	1208	1320	1368	1480
LSA 50.2 L8	kVA	1485	1625	1720	1875	1335	1460	1550	1685	1560	1705	1805	1965	1630	1785	1890	2060
	kW	1188	1300	1376	1500	1068	1168	1240	1350	1250	1364	1444	1572	1304	1428	1512	1650
LSA 50.2 VL10	kVA	1635	1785	1860	2000	1470	1605	1675	1800	1715	1875	1950	2100	1800	1965	2050	2200
	kW	1308	1428	1488	1600	1176	1284	1340	1440	1372	1500	1560	1680	1440	1572	1640	1760
12 wires version winding n°6 (option)																	
Y		380V	416V	440V	480V	380V	416V	440V	480V	380V	416V	440V	480V	380V	416V	440V	480V
Δ		220V	240V	240V		220V	240V	240V		220V	240V	240V		220V	240V	240V	
YY			208V	220V	240V		208V	220V	240V		208V	220V	240V		208V	220V	240V
LSA 50.2 S4	kVA	990	1080	1145	1250	891	972	1030	1125	990	1080	1145	1250	990	1080	1145	1250
	kW	792	864	916	1000	713	778	824	900	792	864	916	1000	792	864	916	1000
LSA 50.2 M6	kVA	1210	1320	1400	1525	1089	1188	1260	1372	1210	1320	1400	1525	1210	1320	1400	1525
	kW	968	1056	1120	1220	871	950	1008	1098	968	1056	1120	1220	968	1056	1120	1220
LSA 50.2 L8	kVA	1430	1565	1655	1800	1287	1409	1490	1620	1430	1565	1655	1800	1430	1565	1655	1800
	kW	1144	1252	1324	1440	1029	1127	1192	1296	1144	1252	1324	1440	1144	1252	1324	1440

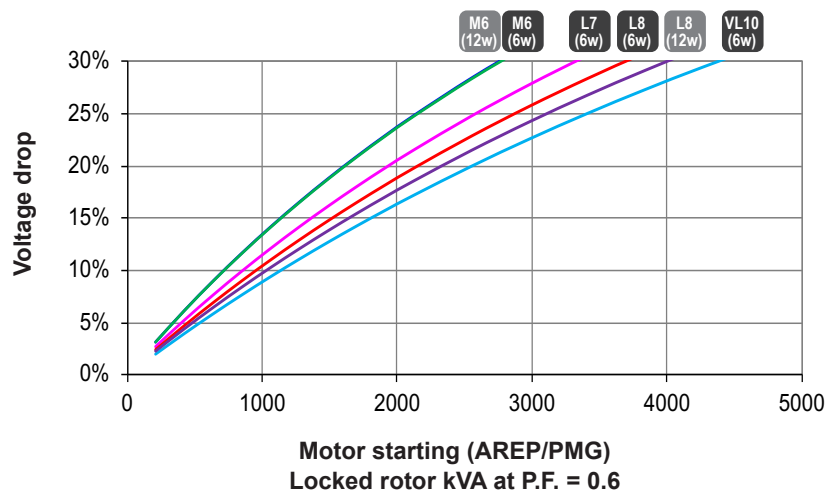
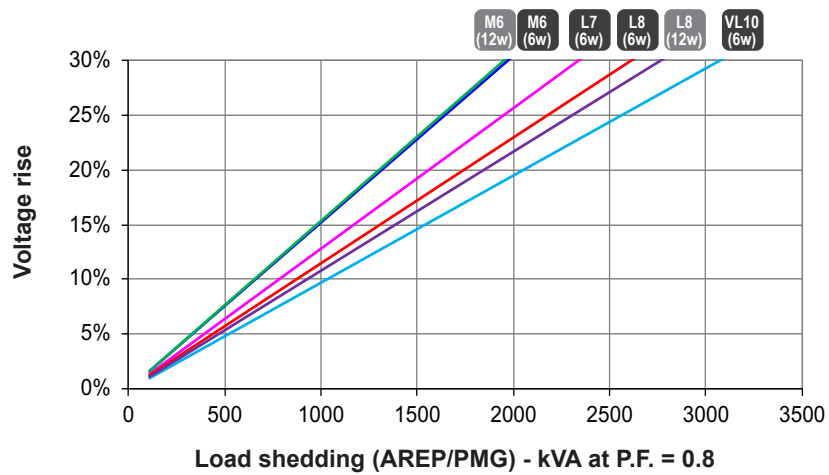
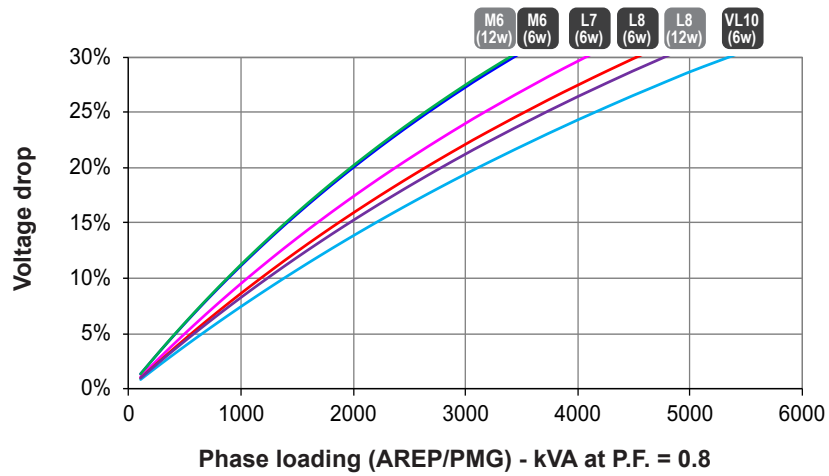
Efficiencies 400V - 50 Hz (..... P.F.: 1) (— P.F.: 0.8)

Reactances (%). Time constants (ms) - Class H / 400 V

		M6 (6w)	L7 (6w)	L8 (6w)	VL10 (6w)	M6 (12w)	L8 (12w)
Kcc	Short-circuit ratio	0.32	0.34	0.32	0.33	0.36	0.37
Xd	Direct-axis synchronous reactance unsaturated	392	364	378	362	345	329
Xq	Quadrature-axis synchronous reactance unsaturated	200	185	193	184	176	168
T'do	No-load transient time constant	3634	3750	3910	4058	3634	4247
X'd	Direct-axis transient reactance saturated	29.1	26.2	26.1	24.1	25.6	20.9
T'd	Short-circuit transient time constant	180	180	180	180	180	180
X''d	Direct-axis subtransient reactance saturated	16.5	14.8	14.8	13.6	14.5	11.8
T''d	Subtransient time constant	18	18	18	18	18	18
X''q	Quadrature-axis subtransient reactance saturated	17.3	15.5	15.4	14.2	15.2	13.4
Xo	Zero sequence reactance	0.8	0.72	0.72	0.66	0.71	0.58
X2	Negative sequence reactance saturated	16.92	15.21	15.14	13.94	14.89	12.67
Ta	Armature time constant	27	27	27	27	27	27

Other class H/400 V data

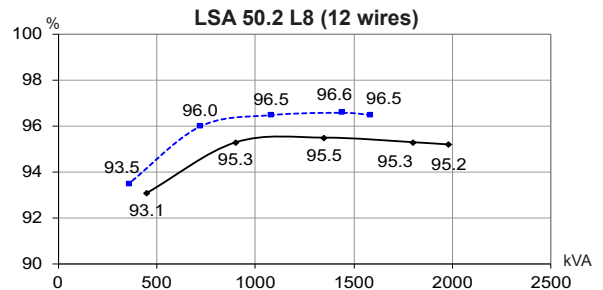
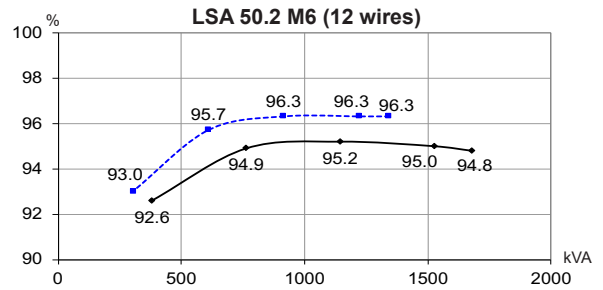
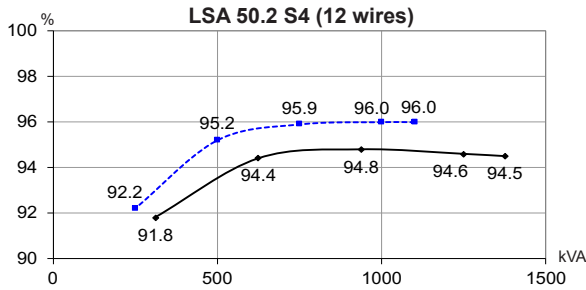
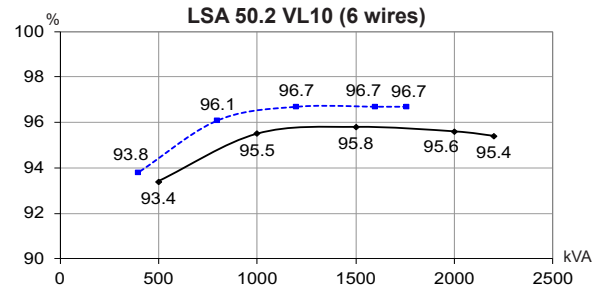
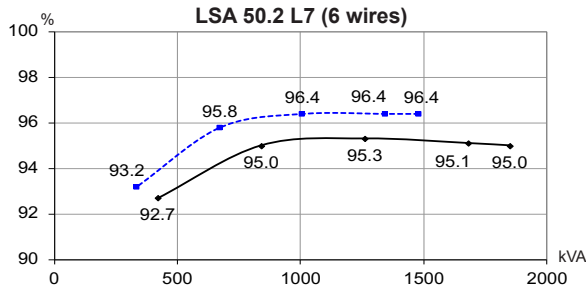
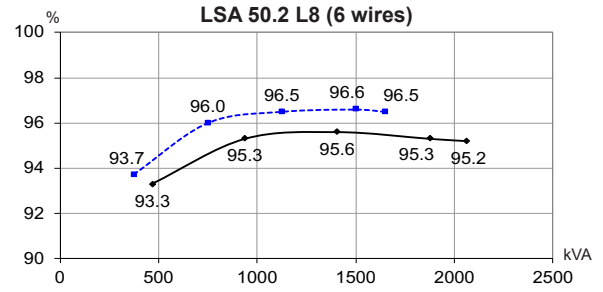
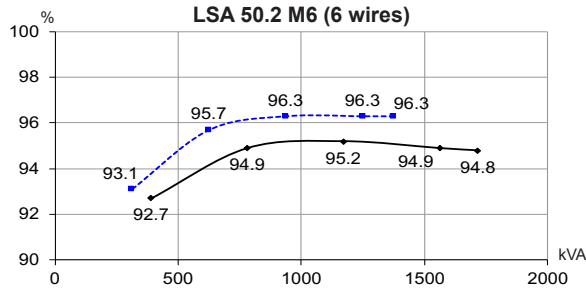
io (A)	No-load excitation current	0.82	0.85	0.78	0.78	0.82	0.79
ic (A)	On-load excitation current	3.6	3.48	3.38	3.26	3.21	3.02
uc (V)	On-load excitation voltage	45.2	43.7	42.4	40.8	40.4	37.9
ms	Response time ($\Delta U = 20\%$ transient)	500	500	500	500	500	500
kVA	Start ($\Delta U = 20\%$ cont. or 30% trans.)	2763	3324	3704	4387	2765	4003
%	Transient ΔU (on-load 4/4) - P.F.: 0.8 _{LAG}	13.6	12.5	12.5	11.7	12.3	10.5
W	No-load losses	14039	15299	15454	16552	14039	15322
W	Heat dissipation	52218	53790	57594	59458	43714	47854

Transient voltage variation 400V - 50 Hz



- 1) For a starting P.F. other than 0.6, the starting kVA must be multiplied by $K = \text{Sine P.F.} / 0.8$
- 2) For voltages other than 400V (Y), 230V(Δ) at 50 Hz, then kVA must be multiplied by $(400/U)^2$ or $(230/U)^2$.

Efficiencies 480V - 60 Hz (..... P.F.: 1) (— P.F.: 0.8)



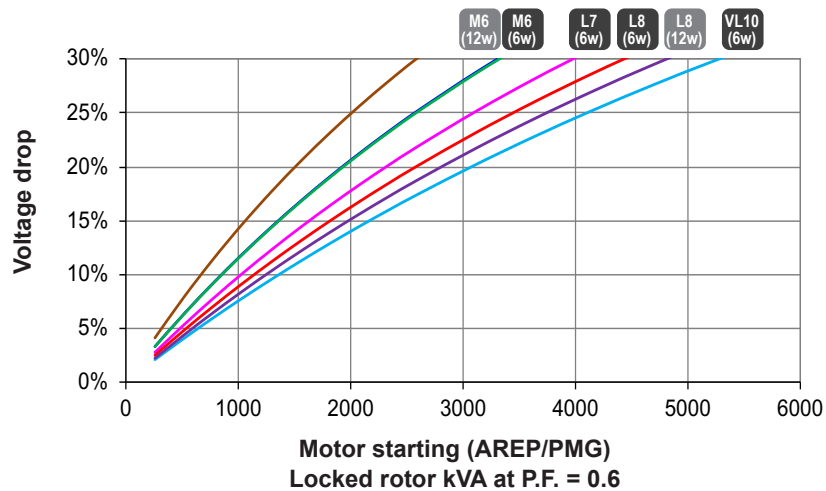
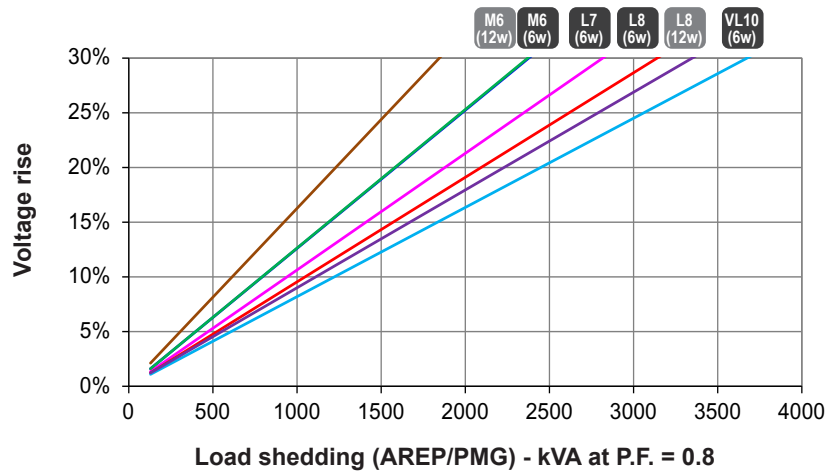
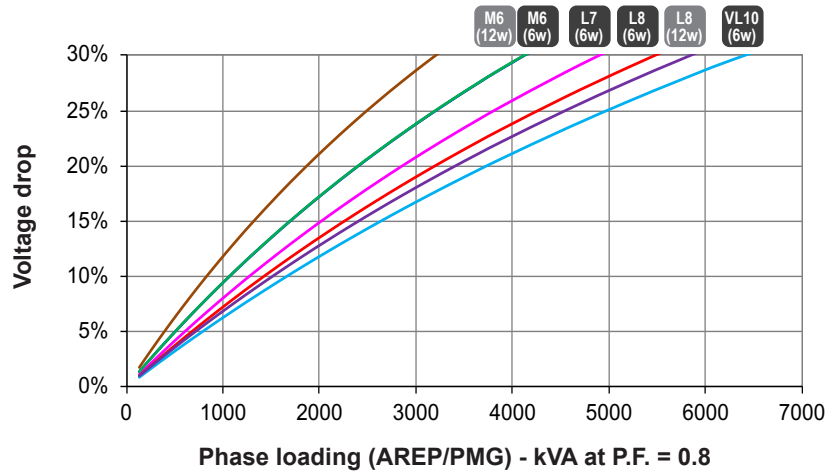
Reactances (%). Time constants (ms) - Class H / 480 V

	M6 (6w)	L7 (6w)	L8 (6w)	VL10 (6w)	S4 (12w)	M6 (12w)	L8 (12w)
Kcc Short-circuit ratio	0.31	0.33	0.3	0.32	0.3	0.31	0.32
Xd Direct-axis synchronous reactance unsaturated	407	377	394	368	394	398	380
Xq Quadrature-axis synchronous reactance unsaturated	208	192	201	187	201	203	193
T'do No-load transient time constant	3634	3750	3910	4058	3411	3634	4247
X'd Direct-axis transient reactance saturated	30.3	27.2	27.2	24.5	31.2	29.6	24.1
T'd Short-circuit transient time constant	180	180	180	180	180	180	180
X''d Direct-axis subtransient reactance saturated	17.1	15.4	15.4	13.8	17.7	16.7	13.7
T''d Subtransient time constant	18	18	18	18	18	18	18
X''q Quadrature-axis subtransient reactance saturated	18	16.1	16.1	14.4	18.6	17.6	15.5
Xo Zero sequence reactance	0.84	0.75	0.75	0.68	0.86	0.82	0.67
X2 Negative sequence reactance saturated	17.6	15.78	15.77	14.17	18.19	17.21	14.62
Ta Armature time constant	27	27	27	27	27	27	27

Other class H/480 V data

io (A) No-load excitation current	0.82	0.85	0.78	0.78	0.78	0.82	0.79
ic (A) On-load excitation current	3.69	3.56	3.47	3.27	3.49	3.61	3.38
uc (V) On-load excitation voltage	46.4	44.8	43.6	41	44	45.5	42.5
ms Response time ($\Delta U = 20\%$ transient)	500	500	500	500	500	500	500
kVA Start ($\Delta U = 20\%$ cont. or 30% trans.)	3305	3977	4433	5272	2578	3321	4803
% Transient ΔU (on-load 4/4) - P.F.: 0.8 _{LAG}	14	12.9	12.9	11.9	14.3	13.7	11.7
W No-load losses	22080	23864	24115	25675	20444	22080	23916
W Heat dissipation	65871	67848	72952	73168	56038	63910	69953

Transient voltage variation 480V - 60 Hz

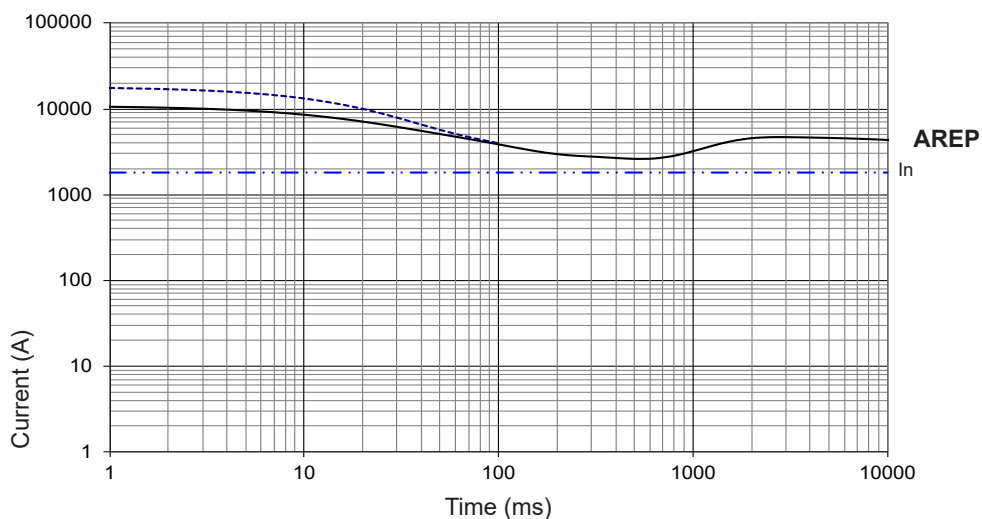


- 1) For a starting P.F. other than 0.6, the starting kVA must be multiplied by $K = \text{Sine P.F.} / 0.8$
- 2) For voltages other than 480V (Y), 277V (Δ), 240V (YY) at 60 Hz, then kVA must be multiplied by $(480/U)^2$ or $(277/U)^2$ or $(240/U)^2$.

3-phase short-circuit curves at no load and rated speed (star connection Y)

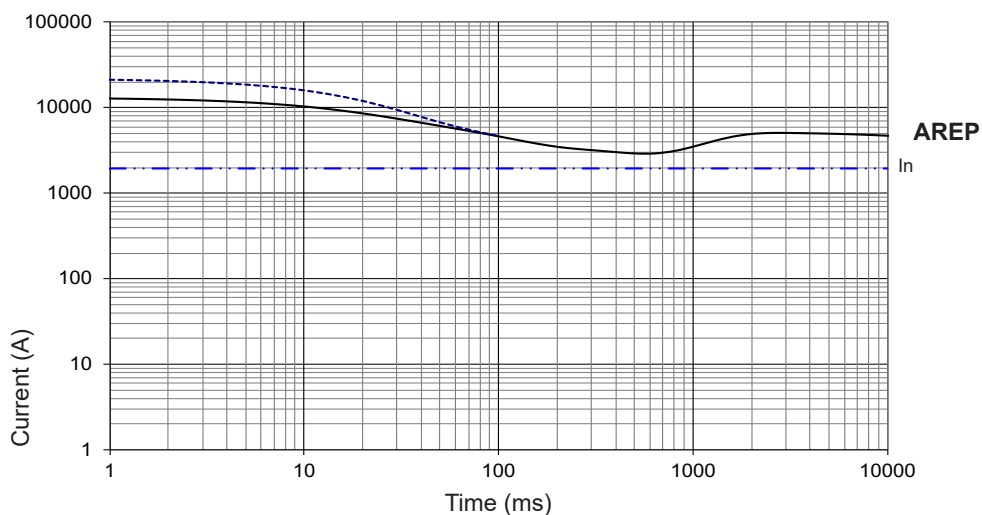
LSA 50.2 M6 (6 wires)

Symmetrical —
Asymmetrical - - -



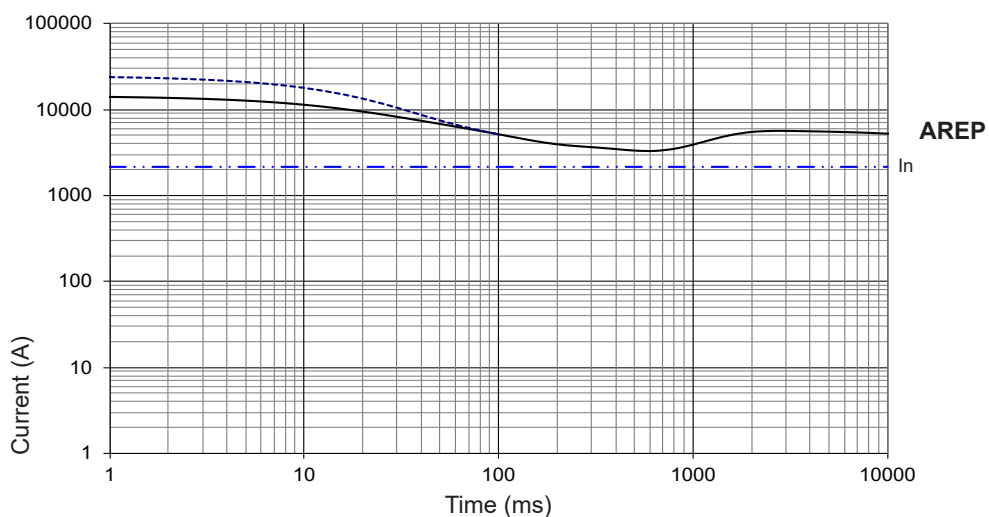
LSA 50.2 L7 (6 wires)

Symmetrical —
Asymmetrical - - -



LSA 50.2 L8 (6 wires)

Symmetrical —
Asymmetrical - - -



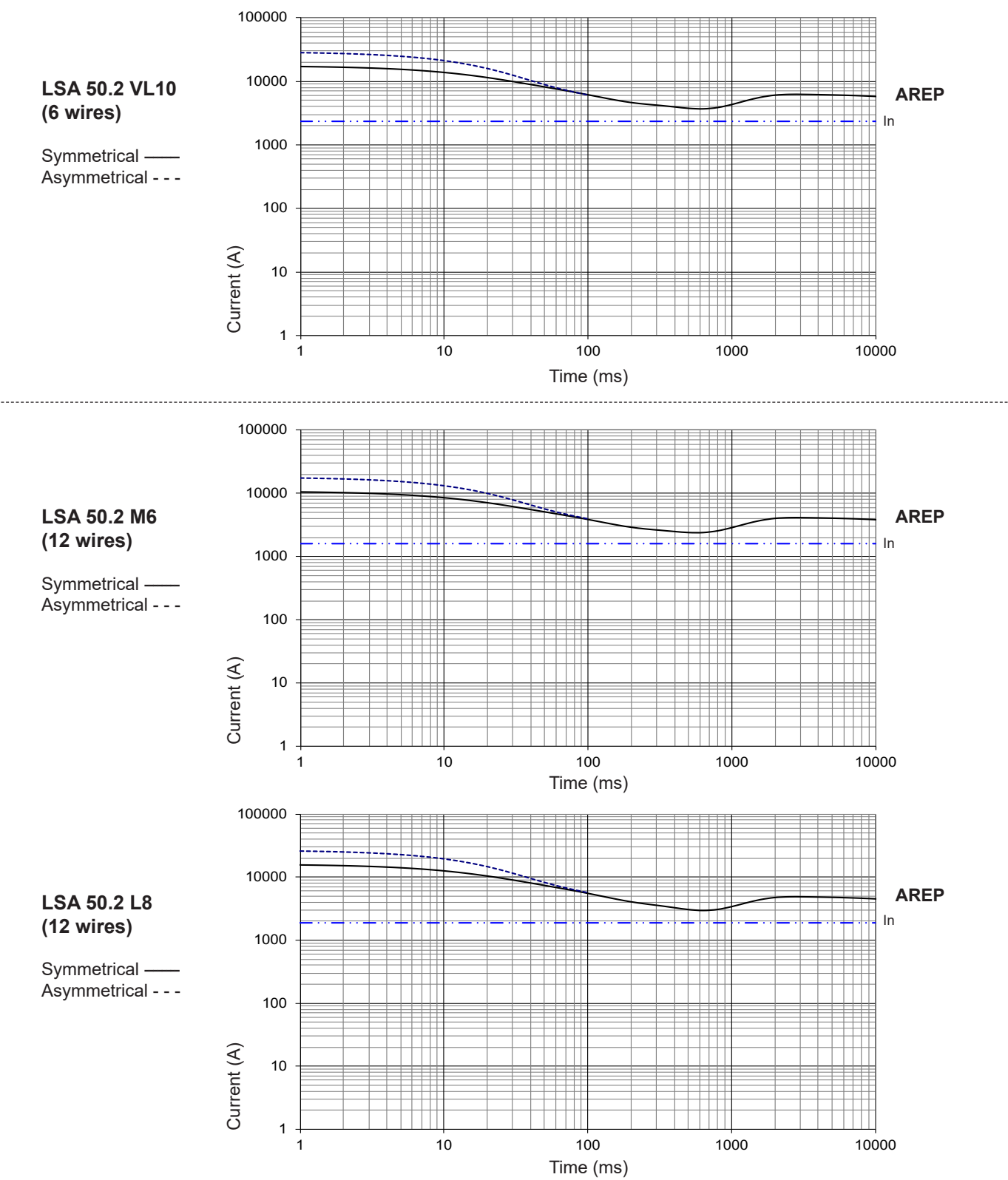
Influence due to connection

Curves shown are for star (Y) connection.

For other connections, use the following multiplication factors:

- Series delta : current value x 1.732 - Parallel star : current value x 2

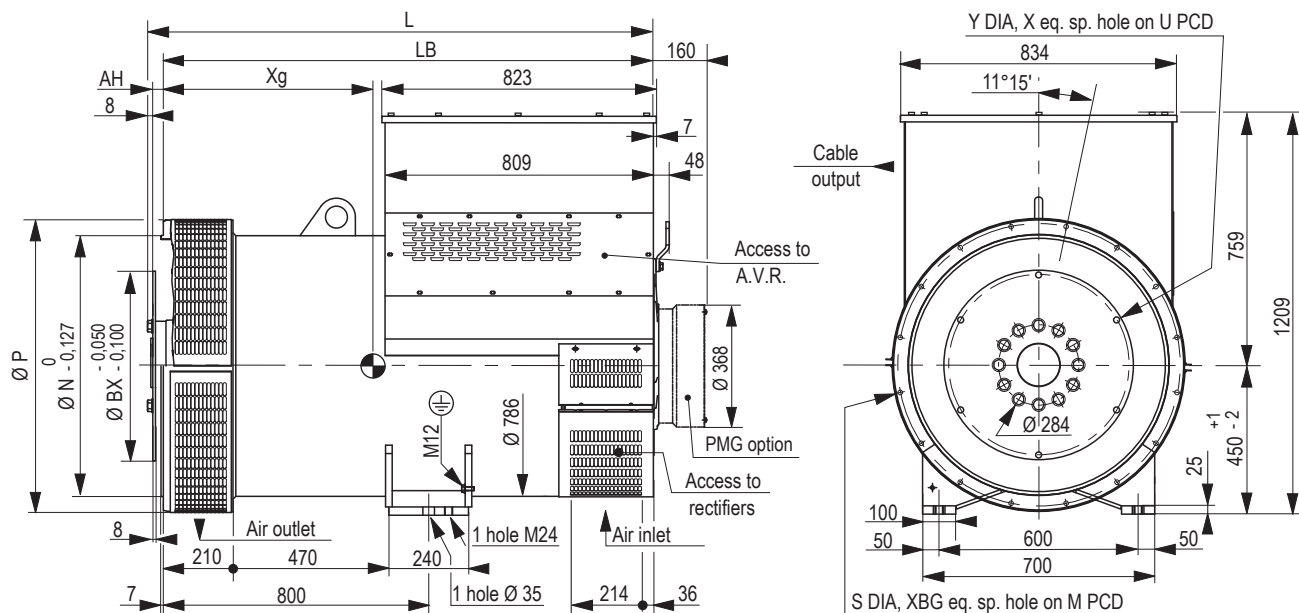
3-phase short-circuit curves at no load and rated speed (star connection Y)



Influence due to short-circuit
Curves are based on a three-phase short-circuit.
For other types of short-circuit, use the following multiplication factors.

	3-phase	2-phase L/L	1-phase L/N
Instantaneous (max.)	1	0.87	1.3
Continuous	1	1.5	2.2
Maximum duration (AREP/PMG)	10 sec.	5 sec.	2 sec.

Single-bearing dimensions



Dimensions (mm) and weight

Type	L without PMG maxi*	LB	Xg	Weight (kg)
LSA 50.2 S4	1302	1278	620	2290
LSA 50.2 M6	1402	1378	640	2490
LSA 50.2 L7	1502	1478	690	2760
LSA 50.2 L8	1502	1478	710	2980
LSA 50.2 VL10	1602	1578	760	3260

* L maxi = LB + AH maxi + 8

Flange (mm)

S.A.E.	P	N	M	XBG	β°
0	880	647.7	679.5	16	14
00	880	787.4	850.9	16	14

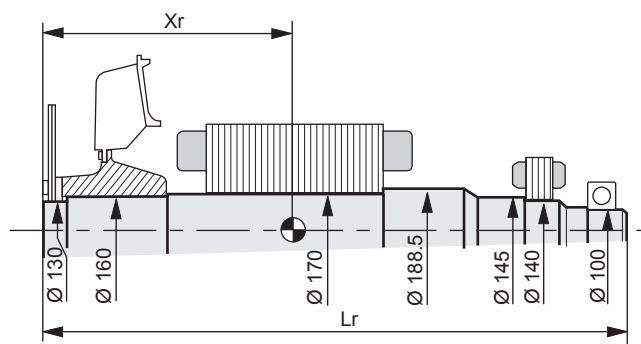
Flex plate (mm)

S.A.E.	BX	U	X	Y	AH
21	673.1	641.3	12	18	0
18	571.5	542.9	6	18	15.7

Coupling

Flex plate	18	21
Flange S.A.E 0	X	
Flange S.A.E 00	X	X

Torsional analysis data

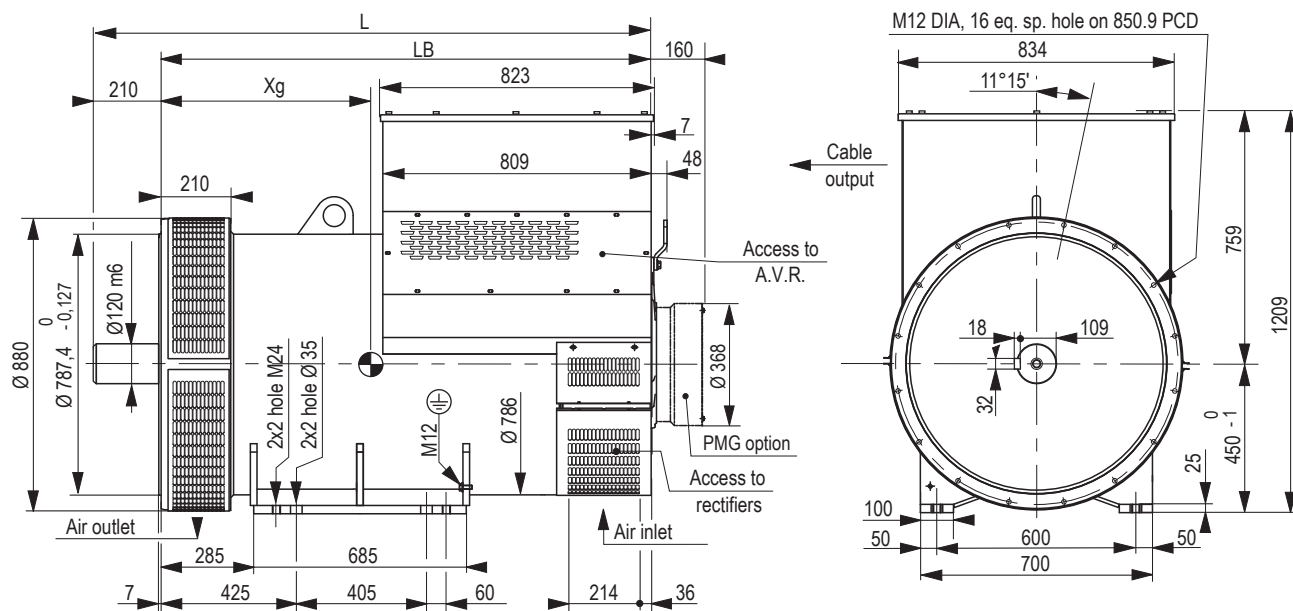


Centre of gravity: Xr (mm), Rotor length: Lr (mm), Weight: M (kg), Moment of inertia: J (kgm²): (4J = MD²)

Flange	S.A.E. 18				S.A.E. 21			
Type	Xr	Lr	M	J	Xr	Lr	M	J
LSA 50.2 S4	564	1320.5	833	18.17	549	1320.5	831	18.62
LSA 50.2 M6	608	1420.5	934	20.6	593	1420.5	932	21.09
LSA 50.2 L7	643	1520.5	1005	22.23	627	1520.5	1003	22.68
LSA 50.2 L8	667	1520.5	1082	24.6	652	1520.5	1081	25.05
LSA 50.2 VL10	714	1620.5	1192	27.27	698	1620.5	1191	27.72

NOTE : Dimensions are for information only and may be subject to modifications. Contractual 2D drawings can be downloaded from the Leroy-Somer site, 3D drawing files are available upon request.
The torsional analysis of the transmission is imperative. All values are available upon request.

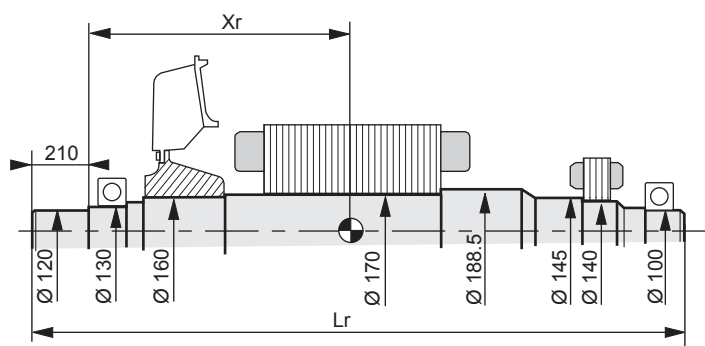
Two-bearing dimensions



Dimensions (mm) and weight

Type	L without PMG	LB	Xg	Weight (kg)
LSA 50.2 S4	1488	1278	600	2330
LSA 50.2 M6	1588	1378	620	2530
LSA 50.2 L7	1688	1478	670	2800
LSA 50.2 L8	1688	1478	690	3010
LSA 50.2 VL10	1788	1578	740	3300

Torsional analysis data



Centre of gravity: Xr (mm), Rotor length: Lr (mm), Weight: M (kg), Moment of inertia: J (kgm²): (4J = MD²)

Type	Xr	Lr	M	J
LSA 50.2 S4	567	1509	800	17.24
LSA 50.2 M6	610	1609	900	19.71
LSA 50.2 L7	645	1709	971	21.29
LSA 50.2 L8	668	1709	1049	23.66
LSA 50.2 VL10	715	1809	1159	26.33

NOTE : Dimensions are for information only and may be subject to modifications. Contractual 2D drawings can be downloaded from the Leroy-Somer site, 3D drawing files are available upon request.
The torsional analysis of the transmission is imperative. All values are available upon request.

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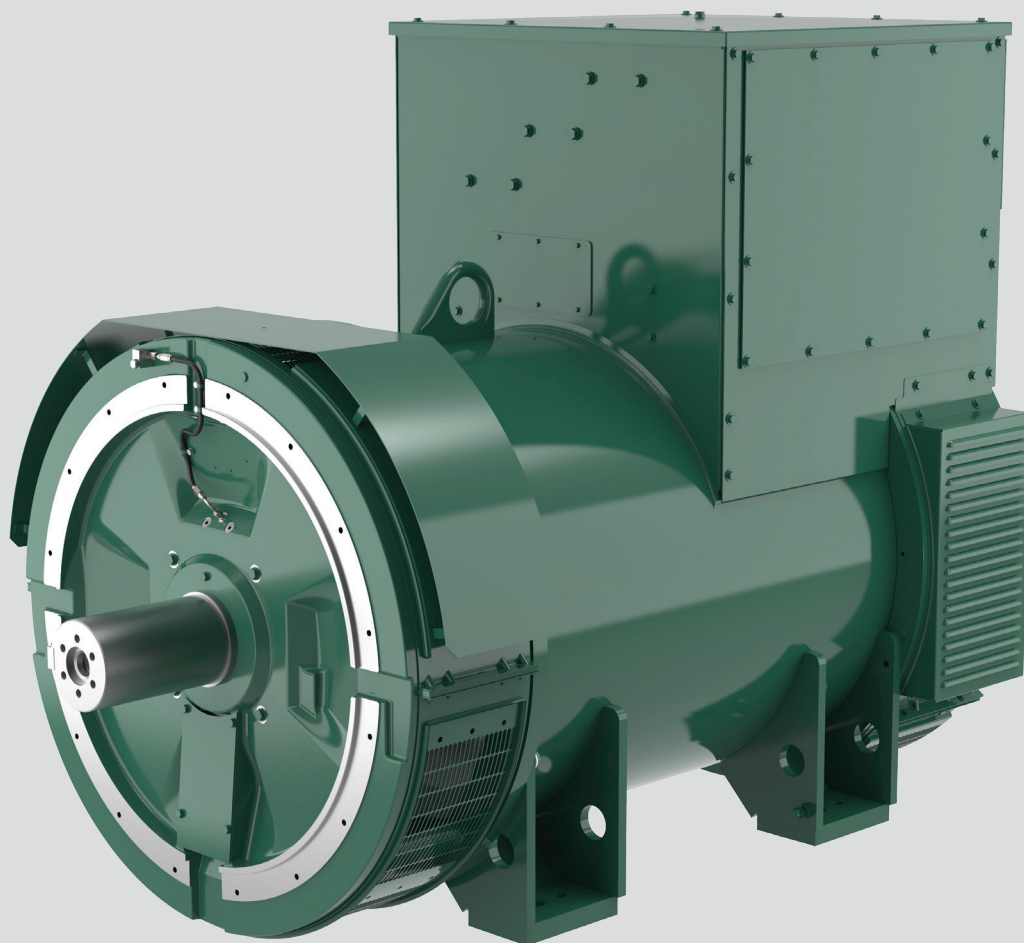
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Nidec
All for dreams

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Moteurs Leroy-Somer SAS. Siège : Bd Marcellin Leroy, CS 10015, 16915 Angoulême Cedex 9, France.
Capital social : 38 679 664 €, RCS Angoulême 338 567 258.



LSA 52.3

Low Voltage Alternator - 4 pole

1860 to 2750 kVA - 50 Hz / 2230 to 3400 kVA - 60 Hz
Electrical and mechanical data

LEROY-SOMER™

Nidec
All for dreams

The best of performance

Nidec Leroy-Somer LSA 52.3 alternator has been designed to offer you the best power generation performances. With its meticulous design and optimized architecture, the LSA 52.3 strikes the perfect balance between compactness, reliability, performance and longevity.

Whatever your application, the LSA 52.3 will meet your needs and will adapt to all situations.

Standards

Nidec Leroy-Somer LSA 52.3 alternator meets all key international standards and regulations, including IEC 60034, NEMA MG 1.32-33, ISO 8528-3, CSA C22.2 n°100-14 and UL 1446 (UL 1004 on request). Also compliant with IEC 61000-6-2, IEC 61000-6-3, IEC 61000-6-4, VDE 0875G, VDE 0875N and EN 55011, group 1 class A for European zone. Nidec Leroy-Somer LSA 52.3 alternator can be integrated in EC marked generator set, and bears EC, EAC and CMIM markings. It is designed, manufactured and marketed in an ISO 9001 and ISO 14001 quality assurance environment.

Electrical characteristics and performances

- Class H insulation
- 2/3 pitch winding, standard 6-wire (6S)
- Voltage range:
 - 50 Hz: 380V - 400V - 415V
 - 60 Hz: 440V - 480V
- High efficiency and motor starting capacity
- Other voltages are possible with optional adapted windings:
 - 50 Hz: 440V (no. 7), 500V (no. 9), 600V (no. 23), 690V (no. 52)
 - 60 Hz: 380V and 416V (no. 8), 600V (no. 9), 690V (no. 22)

Excitation and regulation system

Excitation system			Regulation options		
AVR	AREP + PMI	PMG	C.T. Current transformer for paralleling	Mains paralleling	Remote voltage potentiometer
D550	Standard	Option	√	√	√

3-phase sensing is included as a standard with digital regulators.

Protection system and options

- The LSA 52.3 is IP 23
- Complete winding protection for clean environments with relative humidity $\leq 95\%$, including indoor marine environments
- Options:
 - Filters on air inlet (derating 5%)
 - Filters on air inlet and air outlet (IP 44) (derating 8%)
 - Reinforced winding protection for harsh environments and relative humidity greater than 95% (derating 6%)
 - Space heater
 - Protection or metering CTs
 - Thermal protection for stator winding and/or bearings (PT100)

Mechanical construction

- Compact and rigid assembly to better withstand generator vibrations
- Steel frame
- Cast iron flanges and shields
- Two-bearing and single-bearing versions designed to be suitable for engines on the market
- Half-key balancing
- Regreasable bearings
- Clockwise rotation in standard

Terminal box design

- Easy access to the voltage regulator and to the connections
- Possible inclusion of accessories for paralleling, protection and measurement

General characteristics

Insulation class	H	Excitation system	AREP + PMI
Winding pitch	2/3 (wind. 6S)	AVR type	D550
Number of wires	6	Voltage regulation (*)	± 0.25%
Protection	IP 23	Short-circuit current	300% (3 IN) : 10s
Altitude	≤ 1000 m	Total Harmonic Distortion THD (**) in no-load	< 4%
Overspeed	2250 R.P.M.	Waveform: NEMA = TIF (**)	< 50
Air flow	2.5 m³/s (50 Hz) - 2.8 m³/s (60 Hz)	Waveform: I.E.C. = THF (**)	< 2%

(*) steady state (**) between phases

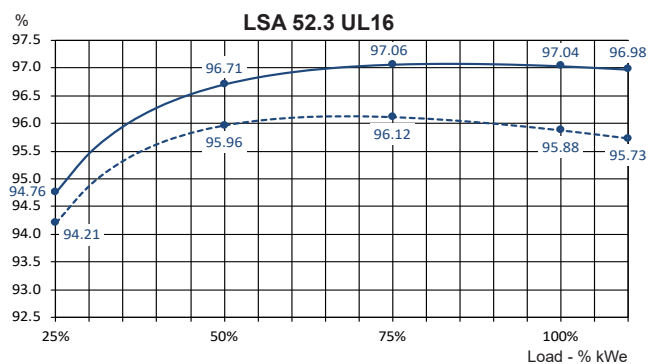
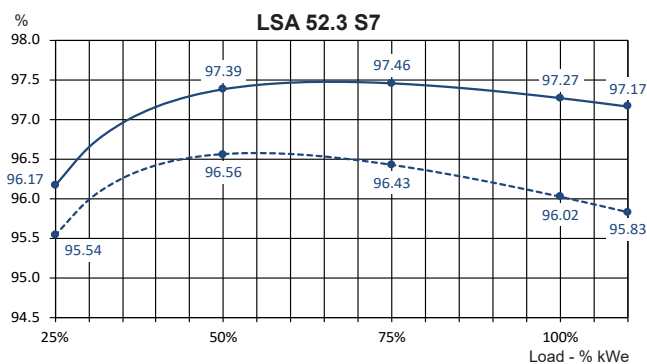
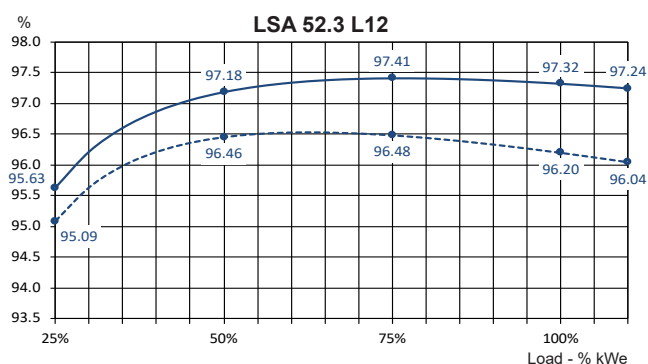
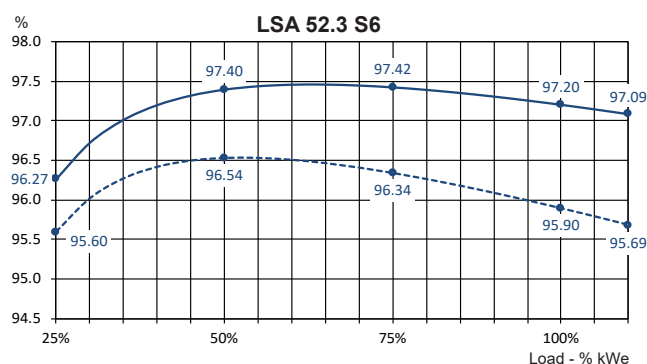
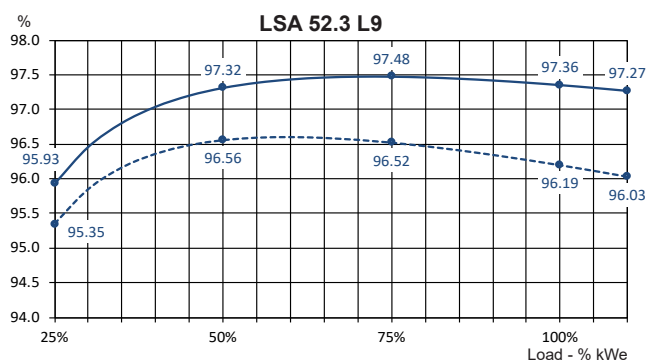
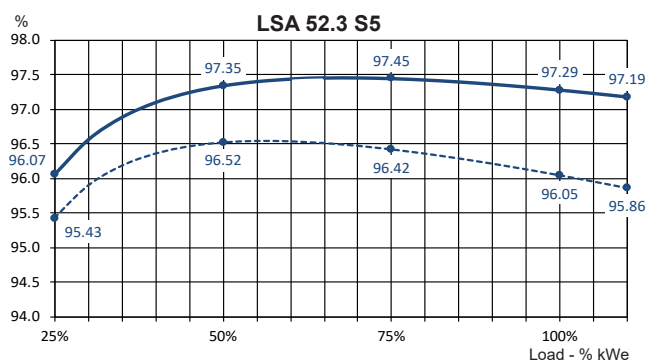
Ratings 50 Hz - 1500 R.P.M.

kVA / kW - P.F. = 0.8													
Duty/T°C		Continuous duty/40°C			Continuous duty/40°C			Stand-by/40°C			Stand-by/27°C		
Class/T°K		H/125°K			F/105°K			H/150°K			H/163°K		
Phase		3 ph.			3 ph.			3 ph.			3 ph.		
Y		380V	400V	415V	380V	400V	415V	380V	400V	415V	380V	400V	415V
LSA 52.3 S5	kVA	1860	1860	1860	1696	1696	1696	1953	1953	1953	2046	2046	2046
	kW	1488	1488	1488	1357	1357	1357	1562	1562	1562	1637	1637	1637
LSA 52.3 S6	kVA	2000	2000	2000	1824	1824	1824	2100	2100	2100	2200	2200	2200
	kW	1600	1600	1600	1459	1459	1459	1680	1680	1680	1760	1760	1760
LSA 52.3 S7	kVA	2200	2200	2200	2006	2006	2006	2310	2310	2310	2420	2420	2420
	kW	1760	1760	1760	1605	1605	1605	1848	1848	1848	1936	1936	1936
LSA 52.3 L9	kVA	2360	2360	2360	2152	2152	2152	2478	2478	2478	2596	2596	2596
	kW	1888	1888	1888	1722	1722	1722	1982	1982	1982	2077	2077	2077
LSA 52.3 L12	kVA	2560	2560	2560	2335	2335	2335	2688	2688	2688	2816	2816	2816
	kW	2048	2048	2048	1868	1868	1868	2150	2150	2150	2253	2253	2253
LSA 52.3 UL16	kVA	2750	2750	2750	2508	2508	2508	2888	2888	2888	3025	3025	3025
	kW	2200	2200	2200	2006	2006	2006	2310	2310	2310	2420	2420	2420

Ratings 60 Hz - 1800 R.P.M.

kVA / kW - P.F. = 0.8									
Duty/T°C		Continuous duty/40°C		Continuous duty/40°C		Stand-by/40°C		Stand-by/27°C	
Class/T°K		H/125°K		F/105°K		H/150°K		H/163°K	
Phase		3 ph.		3 ph.		3 ph.		3 ph.	
Y		440V	480V	440V	480V	440V	480V	440V	480V
LSA 52.3 S5	kVA	2046	2232	1866	2036	2149	2344	2250	2455
	kW	1637	1786	1493	1629	1719	1875	1800	1964
LSA 52.3 S6	kVA	2200	2400	2007	2189	2310	2520	2420	2640
	kW	1760	1920	1606	1751	1848	2016	1936	2112
LSA 52.3 S7	kVA	2420	2640	2207	2408	2541	2772	2662	2904
	kW	1936	2112	1766	1926	2033	2218	2130	2323
LSA 52.3 L9	kVA	2596	2832	2368	2583	2726	2974	2855	3115
	kW	2077	2266	1894	2066	2181	2379	2284	2492
LSA 52.3 L12	kVA	2850	3250	2599	2964	2993	3413	3135	3575
	kW	2280	2600	2079	2371	2394	2730	2508	2860
LSA 52.3 UL16	kVA	3100	3400	2827	3101	3255	3570	3410	3740
	kW	2480	2720	2262	2481	2604	2856	2728	2992

Efficiencies 400V - 50 Hz (— P.F.: 1) (..... P.F.: 0.8)



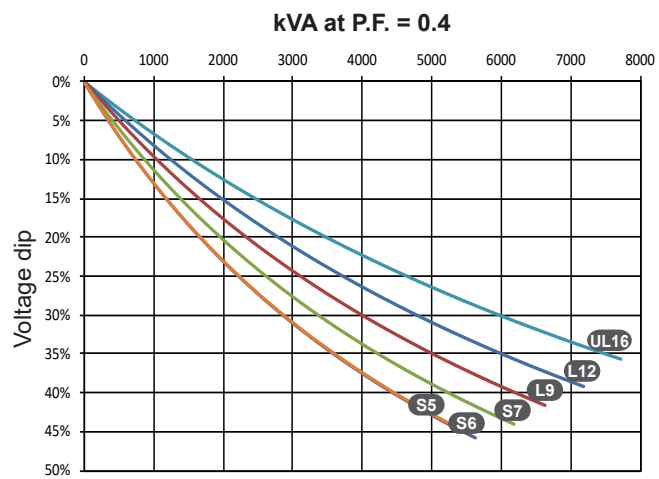
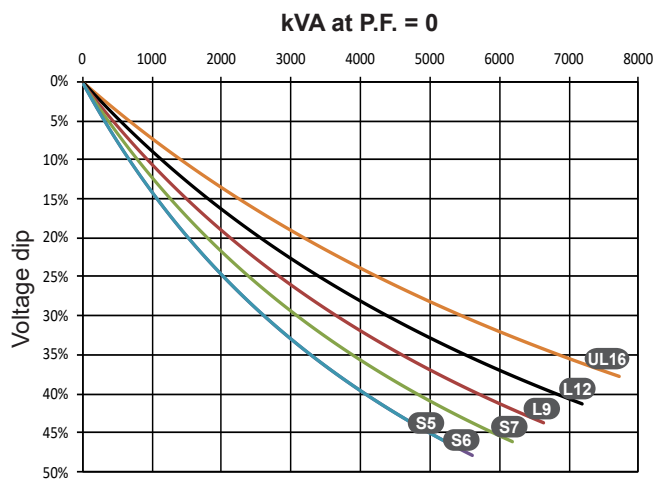
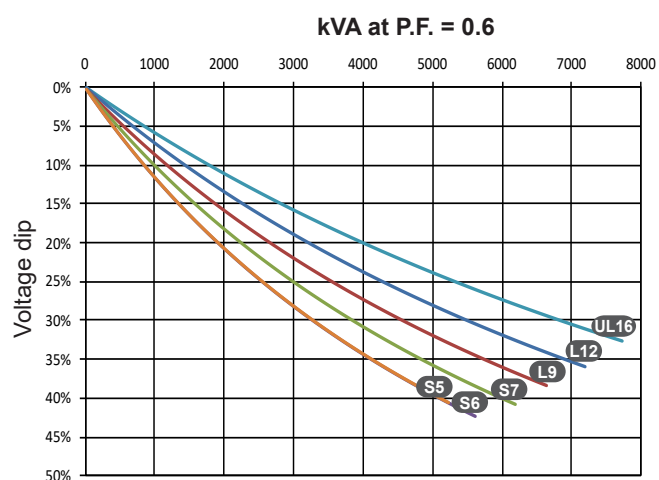
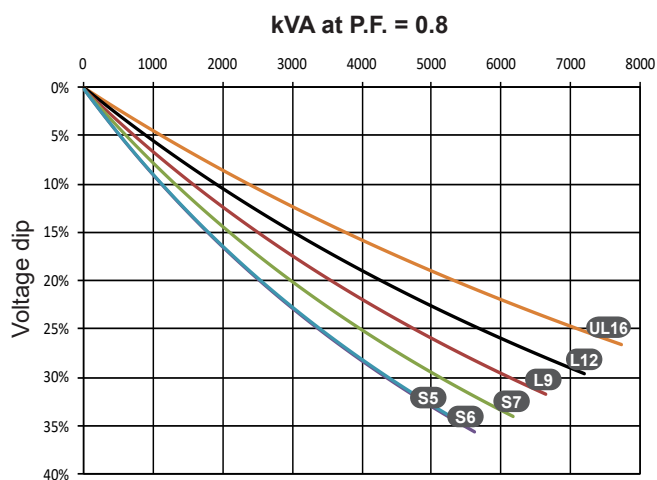
Reactances (%). Time constants (ms) - Class H / 400 V

	S5	S6	S7	L9	L12	UL16
Kcc Short-circuit ratio	0.35	0.32	0.35	0.39	0.42	0.51
Xd Direct-axis synchronous reactance unsaturated	367	380	376	344	313	267
Xq Quadrature-axis synchronous reactance unsaturated	187	194	192	175	160	136
T'do No-load transient time constant	2760	2760	2870	2990	2760	2920
X'd Direct-axis transient reactance saturated	28.7	30.9	28.9	26.1	23.6	20.3
T'd Short-circuit transient time constant	254	264	260	267	245	261
X''d Direct-axis subtransient reactance saturated	15	16.4	14.8	13.2	12.1	10.5
T''d Subtransient time constant	23	23	22	22	13	14
X''q Quadrature-axis subtransient reactance saturated	15.6	16.9	15.4	13.7	12.5	10.8
X0 Zero sequence reactance	2.3	2.5	2.6	2.5	2.7	2.6
X2 Negative sequence reactance saturated	15.3	16.7	15.1	13.4	12.3	10.6
Ta Armature time constant	28	28	28	28	29	30

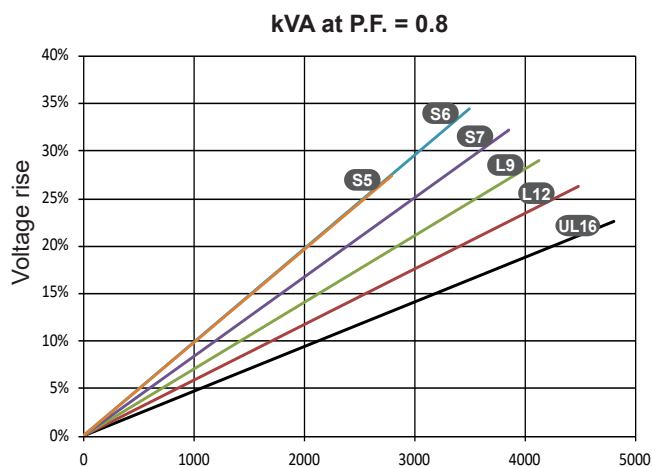
Other class H/400 V data

io (A) No-load excitation current	1.2	1.2	1.2	1.2	1.3	1.4
ic (A) On-load excitation current	4.2	4.5	4.4	4.2	4	3.7
uc (V) On-load excitation voltage	45	47	47	44	42	38
kW No-load losses	15	15	17	20	24	26
kW Heat dissipation	68	76	79.5	79.2	81	100

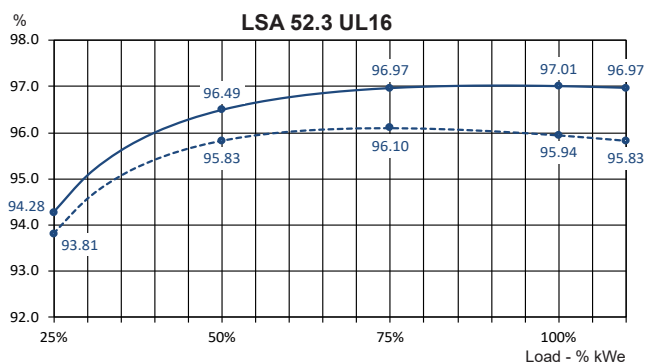
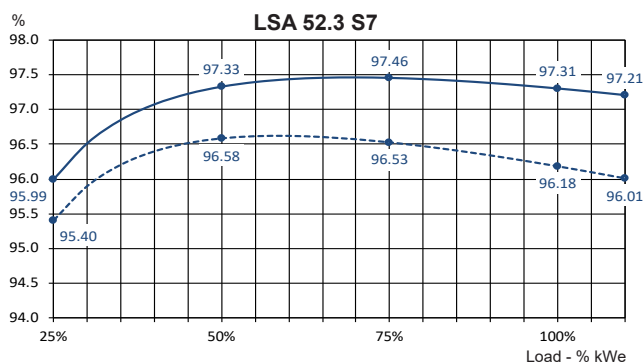
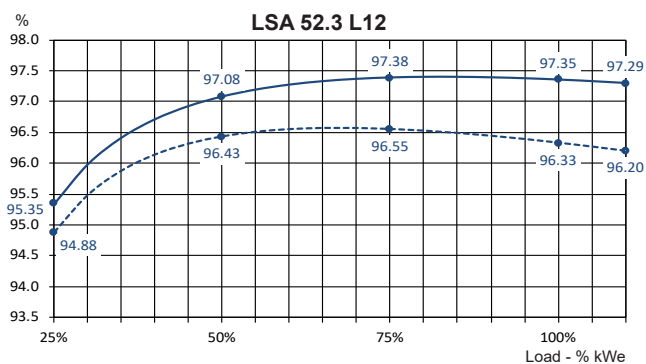
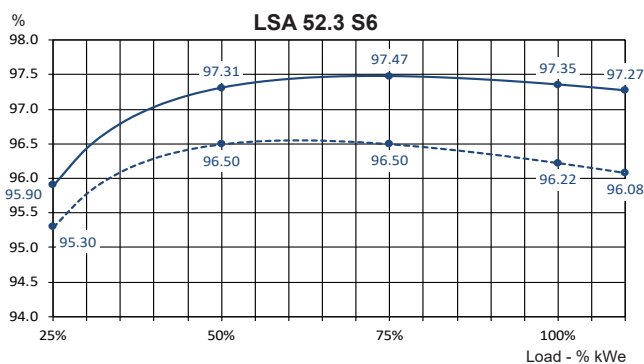
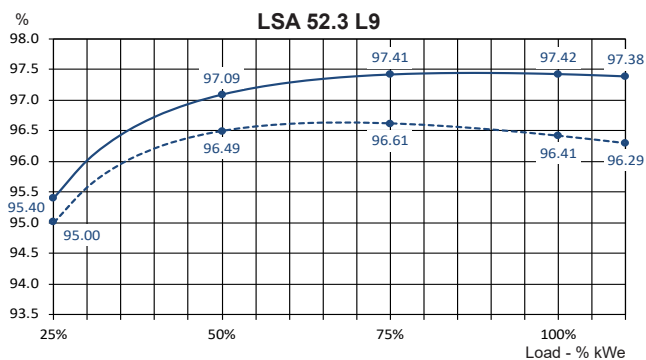
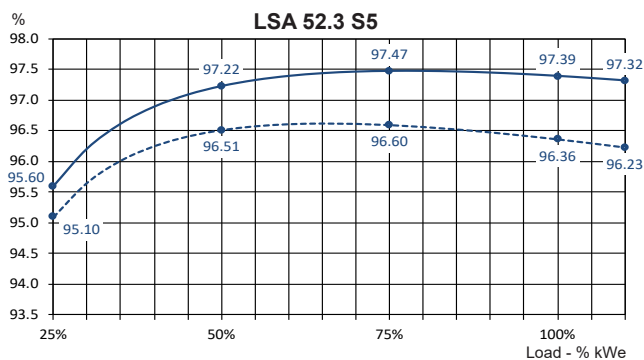
Transient voltage variation at load inrush: 400V - 50 Hz



Transient voltage variation at load rejection: 400V - 50 Hz



Efficiencies 480V - 60 Hz (— P.F.: 1) (----- P.F.: 0.8)



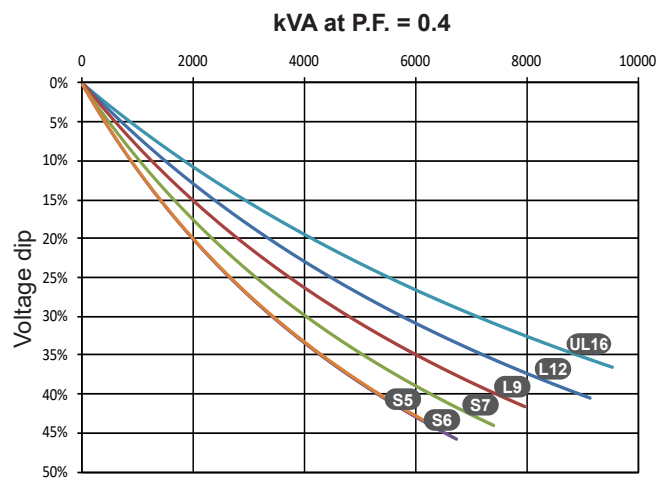
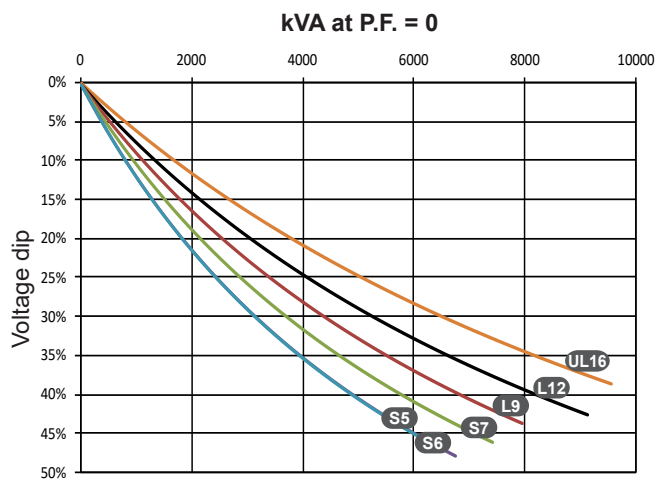
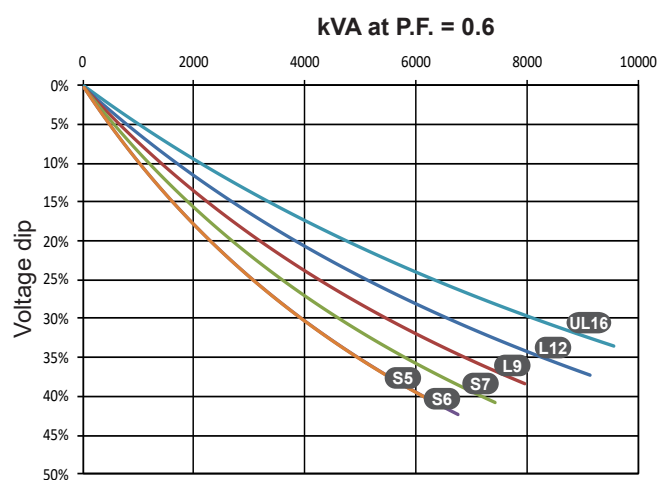
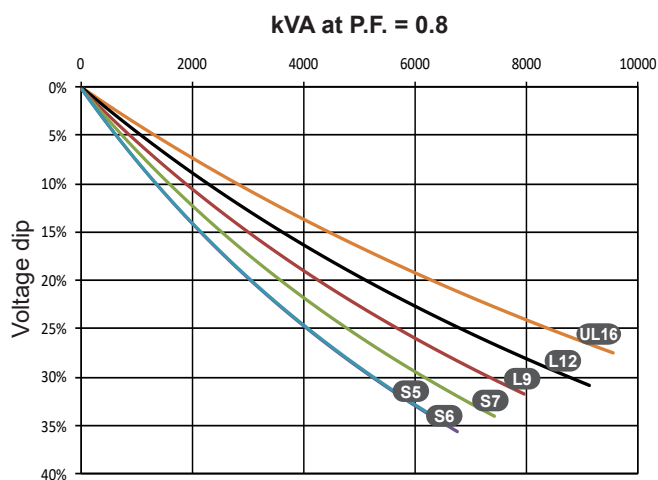
Reactances (%). Time constants (ms) - Class H / 480 V

	S5	S6	S7	L9	L12	UL16
Kcc Short-circuit ratio	0.35	0.32	0.35	0.39	0.40	0.49
Xd Direct-axis synchronous reactance unsaturated	367	380	376	344	331	275
Xq Quadrature-axis synchronous reactance unsaturated	187	194	192	175	169	140
T'do No-load transient time constant	2760	2760	2870	2990	2760	2920
X'd Direct-axis transient reactance saturated	28.7	30.9	28.9	26.1	25	20.9
T'd Short-circuit transient time constant	254	265	260	267	245	261
X''d Direct-axis subtransient reactance saturated	15	16.4	14.8	13.2	12.8	10.8
T''d Subtransient time constant	23	23	22	22	13	14
X''q Quadrature-axis subtransient reactance saturated	15.6	16.9	15.4	13.7	13.2	11.1
X0 Zero sequence reactance	2.3	2.6	2.6	2.5	2.9	2.7
X2 Negative sequence reactance saturated	15.3	16.7	15.1	13.4	13	11
Ta Armature time constant	28	28	28	28	29	30

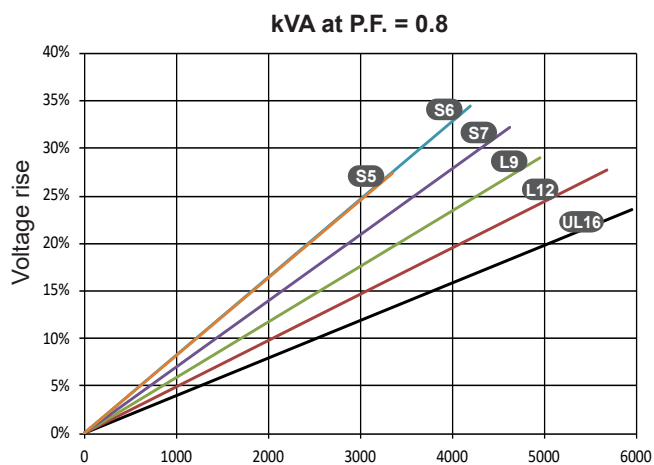
Other class H/480 V data

io (A) No-load excitation current	1.1	1.1	1.2	1.2	1.2	1.3
ic (A) On-load excitation current	4	4.3	4.3	4	4	3.6
uc (V) On-load excitation voltage	43	46	45	43	42	36
kW No-load losses	21	21	24	28	33	36
kW Heat dissipation	73	82	86	87	96	120

Transient voltage variation at load inrush: 480V - 60 Hz

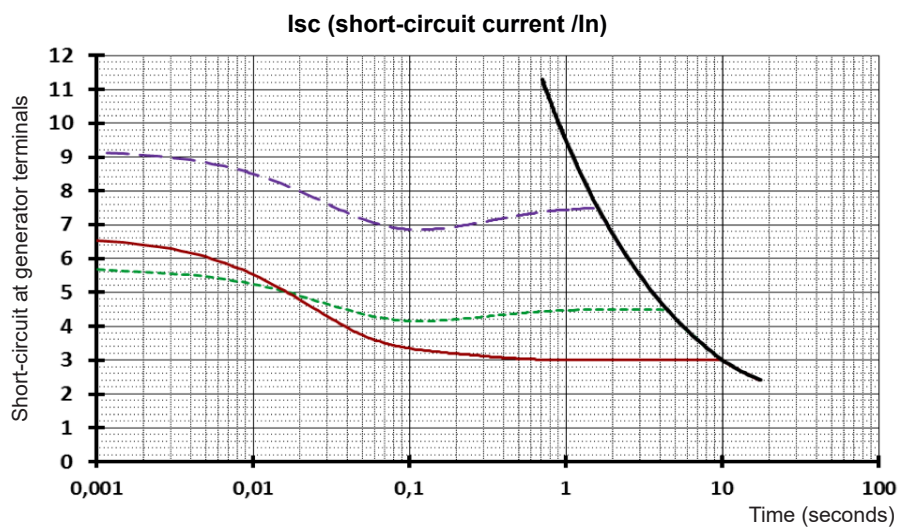


Transient voltage variation at load rejection: 480V - 60 Hz

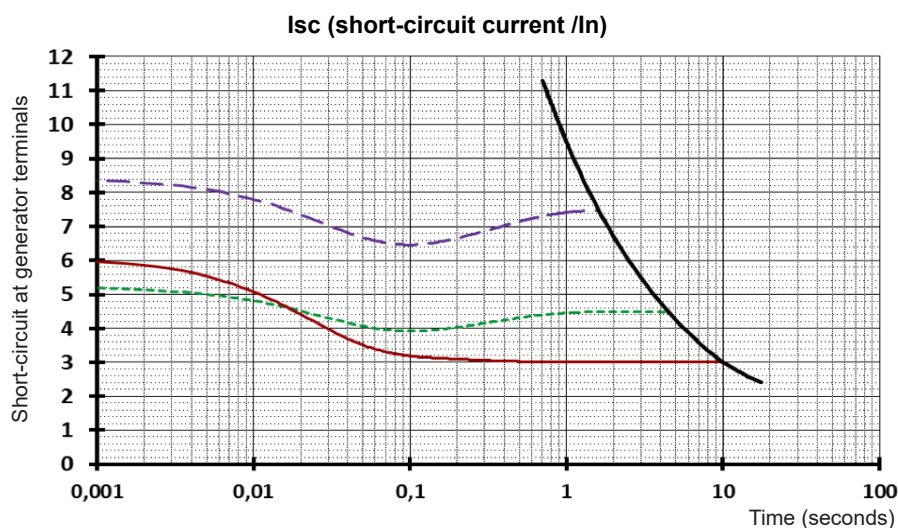


Short-circuit curves at rated speed (star connection Y)

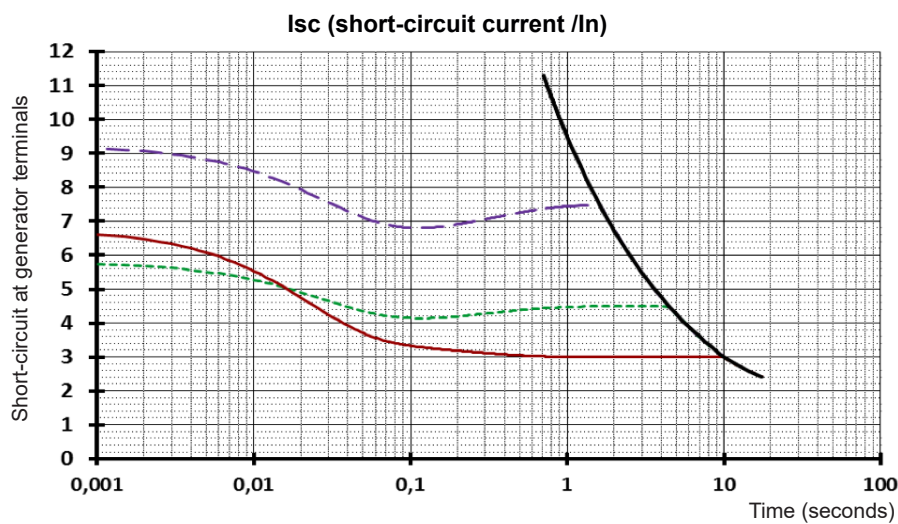
LSA 52.3 S5



LSA 52.3 S6



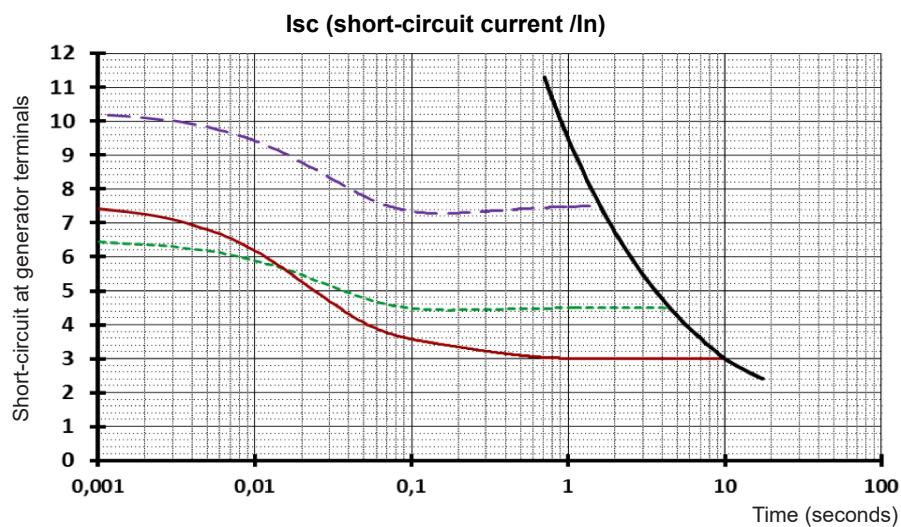
LSA 52.3 S7



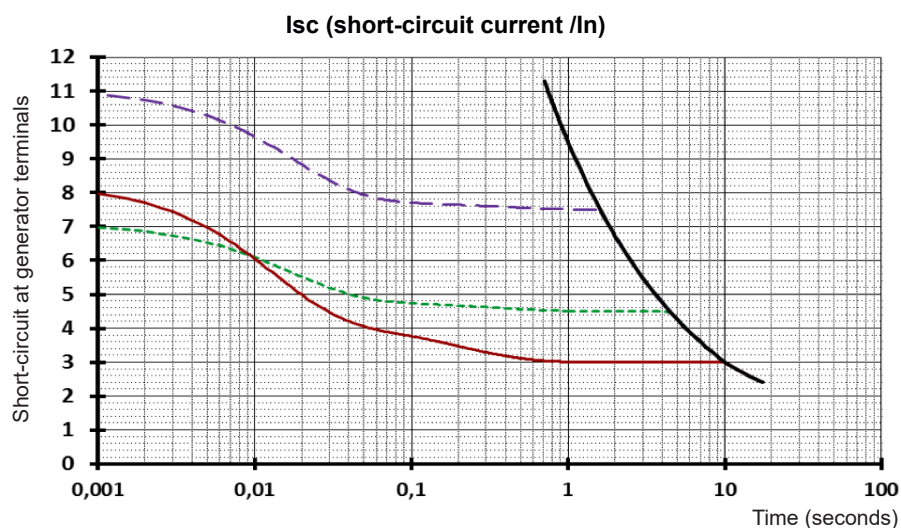
- Symetrical phase to neutral short-circuit
- - - Symetrical two-phase short-circuit
- Symetrical three-phase short-circuit
- Thermal limit curve

Short-circuit curves at rated speed (star connection Y)

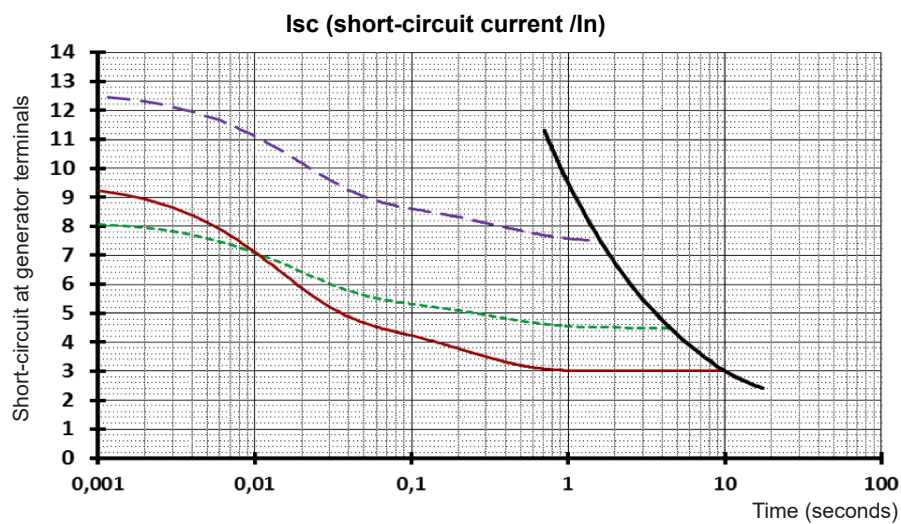
LSA 52.3 L9



LSA 52.3 L12

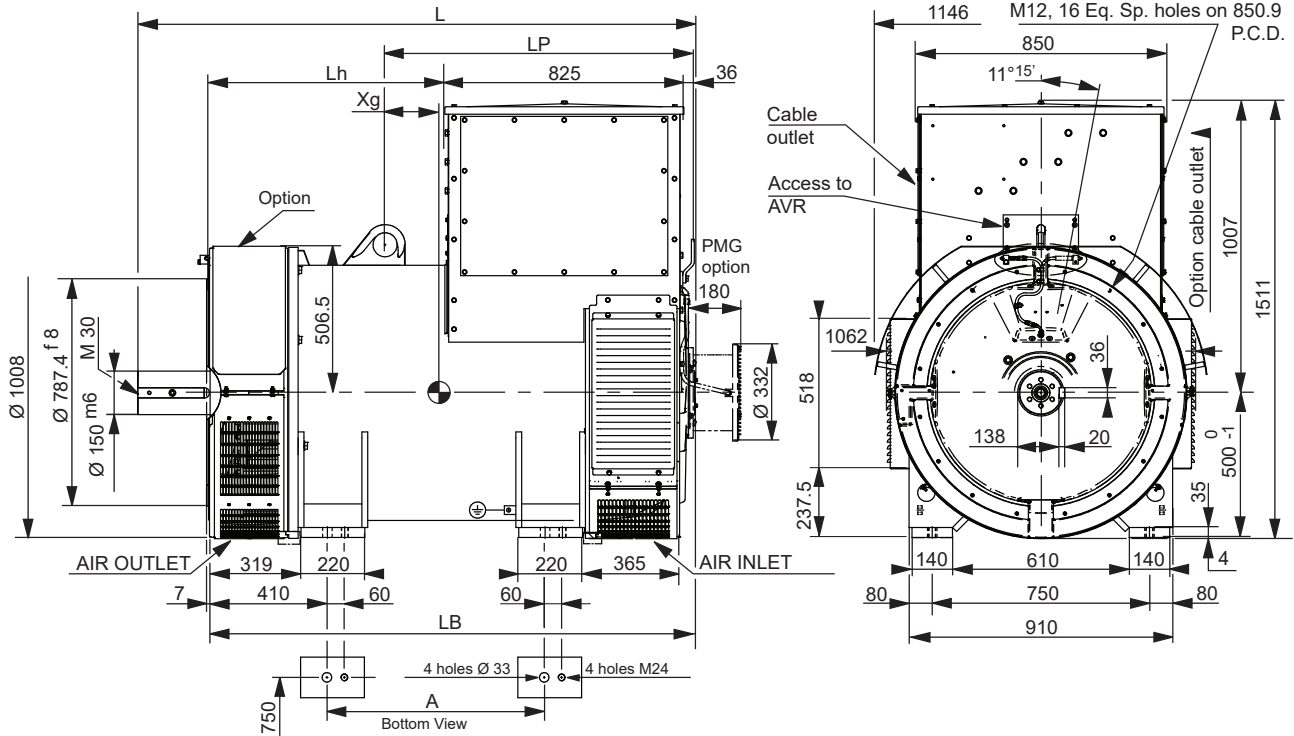


LSA 52.3 UL16



- Symetrical phase to neutral short-circuit
- - - Symetrical two-phase short-circuit
- Symetrical three-phase short-circuit
- Thermal limit curve

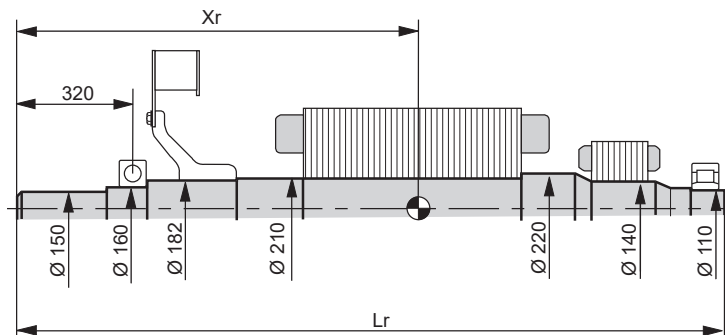
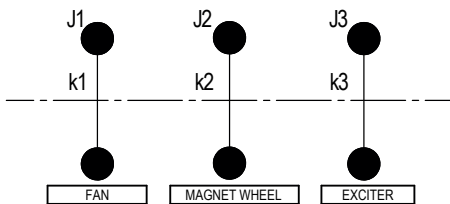
Two-bearing dimensions



Dimensions (mm) and weight

Type	L without PMG	LB	A	Lh	LP	Xg	Weight (kg)
LSA 52.3 S5	1933	1683	750	814	1067.5	179	3742
LSA 52.3 S6	1933	1683	750	814	1067.5	179	3742
LSA 52.3 S7	1933	1683	750	814	1067.5	197	3990
LSA 52.3 L9	2133	1883	950	1014	1067.5	68	4441
LSA 52.3 L12	2133	1883	950	1014	1067.5	109	4939
LSA 52.3 UL16	2283	2033	1100	1164	1412	392	5691

Torsional analysis data



Centre of gravity: X_r (mm), Rotor length: L_r (mm), Weight: M (kg),
Moment of inertia: J (kgm^2) : ($4J = MD^2$)

Torsional rigidity

Type	X_r	L_r	M	J	Torsional rigidity					
					[Nm/rad]			(kg.m ²)		
					k1	k2	k3	J1	J2	J3
LSA 52.3 S5	977.3	1917	1357	40.5	1.79 E+7	3.05 E+7	1.46 E+7	7.7	31.2	1.5
LSA 52.3 S6	977.3	1917	1357	40.5	1.79 E+7	3.05 E+7	1.46 E+7	7.7	31.2	1.5
LSA 52.3 S7	999.9	1917	1450	44	1.79 E+7	2.91 E+7	1.51 E+7	7.7	34.8	1.5
LSA 52.3 L9	1069.1	2117	1642	49.4	1.79 E+7	2.74 E+7	1.36 E+7	7.7	40.1	1.6
LSA 52.3 L12	1116.4	2117	1827	56.5	1.79 E+7	2.53 E+7	1.44 E+7	7.7	47.3	1.4
LSA 52.3 UL16	1204.1	2267	2114	66.6	1.79 E+7	2.28 E+7	1.01 E+7	7.7	57.6	1.3

NOTE : Dimensions are for information only and may be subject to modifications. Contractual 2D drawings can be downloaded from the Leroy-Somer site, 3D drawing files are available upon request.
The torsional analysis of the transmission is imperative. All values are available upon request.

LEROY-SOMERTM

www.leroy-somer.com/epg

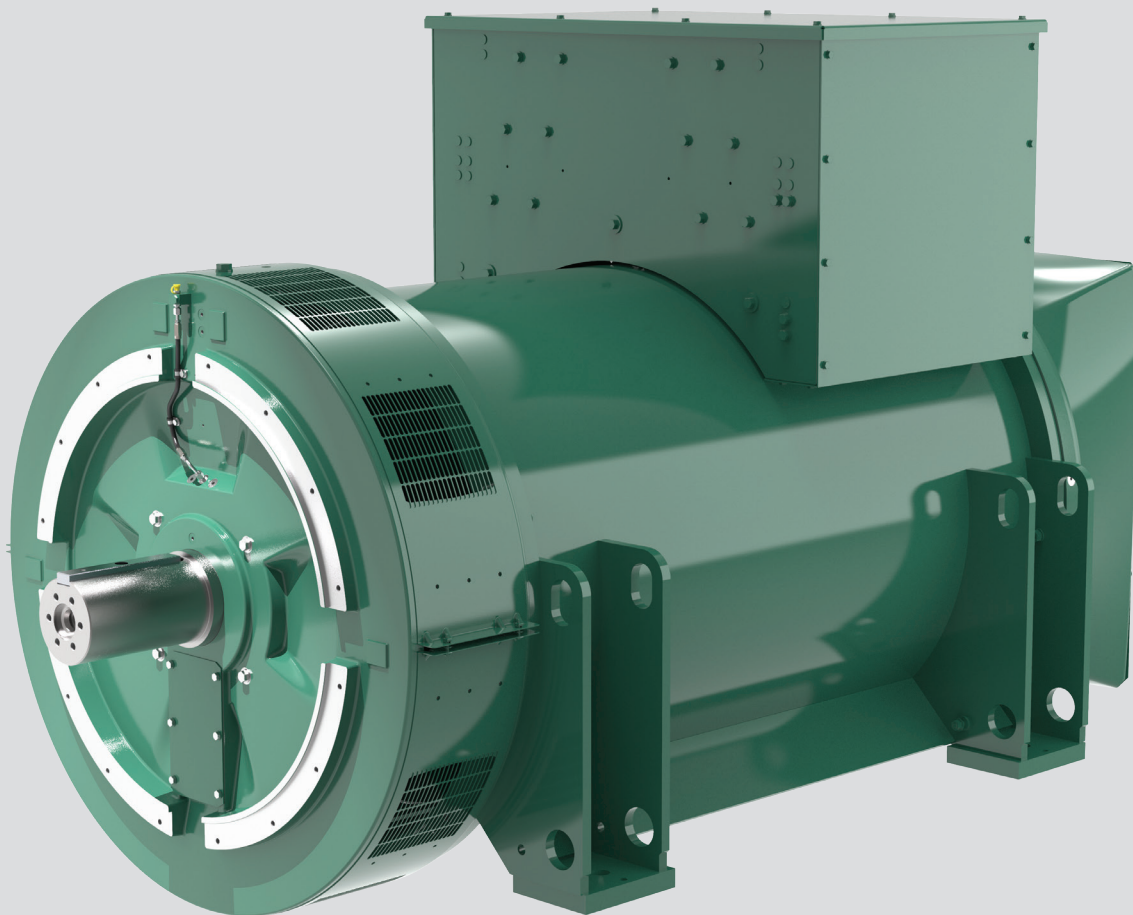
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Nidec
All for dreams

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Moteurs Leroy-Somer SAS. Siège : Bd Marcellin Leroy, CS 10015, 16915 Angoulême Cedex 9, France.
Capital social : 38 679 664 €, RCS Angoulême 338 567 258.



LSA 53.2

Low Voltage Alternator - 4 pole

2650 to 3300 kVA - 50 Hz / 3150 to 3900 kVA - 60 Hz
Electrical and mechanical data

LEROY-SOMER™

Nidec
All for dreams

The best of performance

The Nidec Leroy-Somer LSA 53.2 alternator has been designed to offer you the best power generation performances. With its meticulous design and optimized architecture, the LSA 53.2 strikes the perfect balance between compactness, reliability, performance and longevity.

Whatever your application, the LSA 53.2 will meet your needs and will adapt to all situations.

Standards

Nidec Leroy-Somer LSA 53.2 alternator meets all key international standards and regulations, including IEC 60034, NEMA MG 1.32-33, ISO 8528-3, CSA C22.2 n°100-14 and UL 1446 (UL 1004 on request). Also compliant with IEC 61000-6-2, IEC 61000-6-3, IEC 61000-6-4, VDE 0875G, VDE 0875N and EN 55011, group 1 class A for European zone. Nidec Leroy-Somer LSA 53.2 alternator can be integrated in EC marked generator set, and bears EC, EAC and CMIM markings. It is designed, manufactured and marketed in an ISO 9001 and ISO 14001 quality assurance environment.

Electrical characteristics and performances

- Class H insulation
- 2/3 pitch winding, standard 6-wire (6S)
- Voltage range:
 - 50 Hz: 380V - 400V - 415V
 - 60 Hz: 440V - 480V
- High efficiency and motor starting capacity
- Other voltages are possible with optional adapted windings:
 - 50 Hz: 440V (no. 7S), 500V (no. 9S), 600V (no. 23S), 690V (no. 52S)
 - 60 Hz: 380V and 416V (no. 8S), 600V (no. 9S), 690V (no. 22S)

Excitation and regulation system

Excitation system			Regulation options		
AVR	AREP + PMI	PMG	C.T. Current transformer for paralleling	Mains paralleling	Remote voltage potentiometer
D550	Standard	Option	√	√	√

3-phase sensing is included as a standard with digital regulators.

Protection system and options

- These alternators are IP 23
- Complete winding protection for clean environments with relative humidity $\leq 95\%$
- Options:
 - Filters on air inlet: derating 5%
 - Filters on air inlet and air outlet (IP 44): derating 10%
 - Reinforced winding protection for harsh environments and relative humidity greater than 95%
 - Space heater
 - Protection or metering CTs
 - Thermal protection for stator winding and/or bearings (PT100)

Mechanical construction

- Compact and rigid assembly to better withstand generator vibrations
- Steel frame
- Cast iron flanges and shields
- Two-bearing and single-bearing versions designed to be suitable for engines on the market
- Half-key balancing
- Regreasable bearings
- Clockwise rotation in standard

Terminal box design

- Easy access to the voltage regulator and to the connections
- Possible inclusion of accessories for paralleling, protection and measurement

General characteristics

Insulation class	H	Excitation system	AREP + PMI
Winding pitch	2/3 (wind. 6S)	AVR type	D550
Number of wires	6	Voltage regulation (*)	± 0.25 %
Protection	IP 23	Short-circuit current	300% (3 IN) : 10s
Altitude	≤ 1000 m	Total Harmonic Distortion THD (**) in no-load	< 4 %
Overspeed	2250 R.P.M.	Waveform: NEMA = TIF (**)	< 50
Air flow	2.5 m³/s (50 Hz) - 2.8 m³/s (60 Hz)	Waveform: I.E.C. = THF (**)	< 2 %

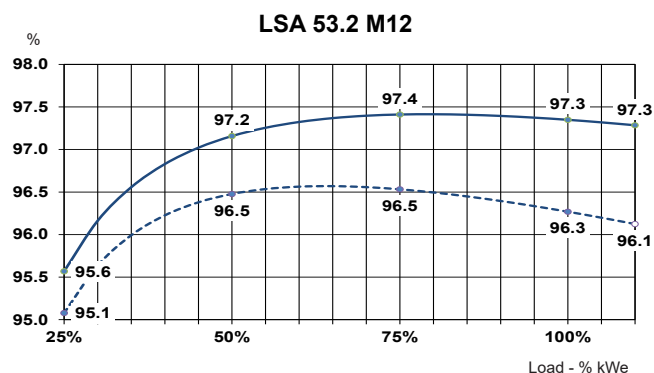
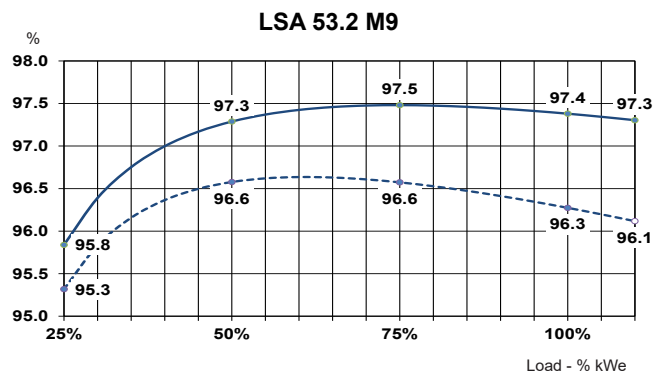
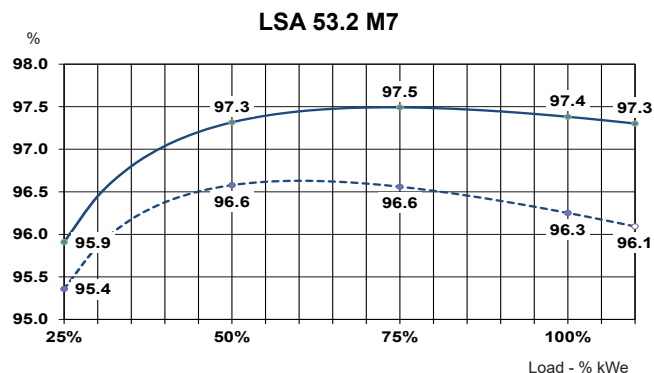
(*) steady state (**) between phases

Ratings 50 Hz - 1500 R.P.M.

kVA / kW - P.F. = 0.8												
Duty/T°C	Continuous duty/40°C			Continuous duty/40°C			Stand-by/40°C			Stand-by/27°C		
Class/T°K	H/125°K			F/105°K			H/150°K			H/163°K		
Phase	3 ph.			3 ph.			3 ph.			3 ph.		
Y	380V	400V	415V	380V	400V	415V	380V	400V	415V	380V	400V	415V
LSA 53.2 M7 kVA	2650	2650	2650	2417	2417	2417	2783	2783	2783	2915	2915	2915
kW	2120	2120	2120	1934	1934	1934	2226	2226	2226	2332	2332	2332
LSA 53.2 M9 kVA	3000	3000	3000	2736	2736	2736	3150	3150	3150	3300	3300	3300
kW	2400	2400	2400	2189	2189	2189	2520	2520	2520	2640	2640	2640
LSA 53.2 M12 kVA	3300	3300	3300	3010	3010	3010	3465	3465	3465	3630	3630	3630
kW	2640	2640	2640	2408	2408	2408	2772	2772	2772	2904	2904	2904

Ratings 60 Hz - 1800 R.P.M.

kVA / kW - P.F. = 0.8									
Duty/T°C		Continuous duty/40°C		Continuous duty/40°C		Stand-by/40°C		Stand-by/27°C	
Class/T°K		H/125°K		F/105°K		H/150°K		H/163°K	
Phase		3 ph.		3 ph.		3 ph.		3 ph.	
Y		440V	480V	440V	480V	440V	480V	440V	480V
LSA 53.2 M7	kVA	2888	3150	2634	2873	3032	3308	3176	3465
	kW	2310	2520	2107	2298	2426	2646	2541	2772
LSA 53.2 M9	kVA	3300	3600	3010	3283	3465	3780	3630	3960
	kW	2640	2880	2408	2626	2772	3024	2904	3168
LSA 53.2 M12	kVA	3630	3900	3311	3557	3812	4095	3993	4290
	kW	2904	3120	2649	2846	3050	3276	3194	3432

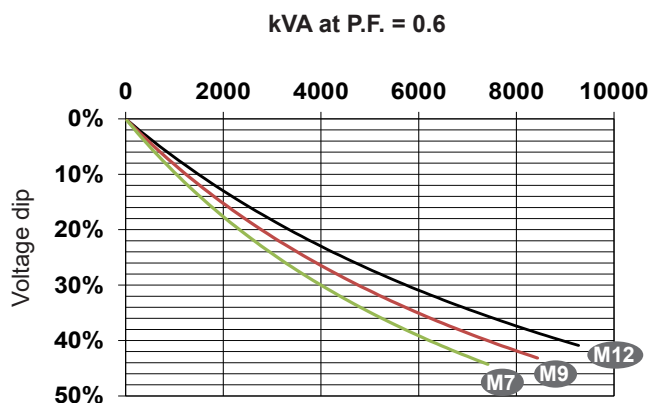
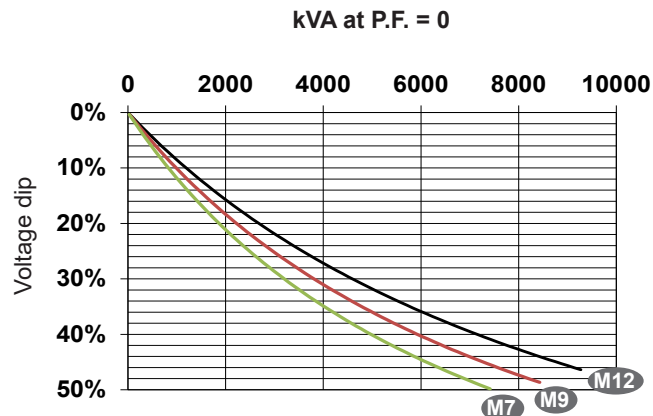
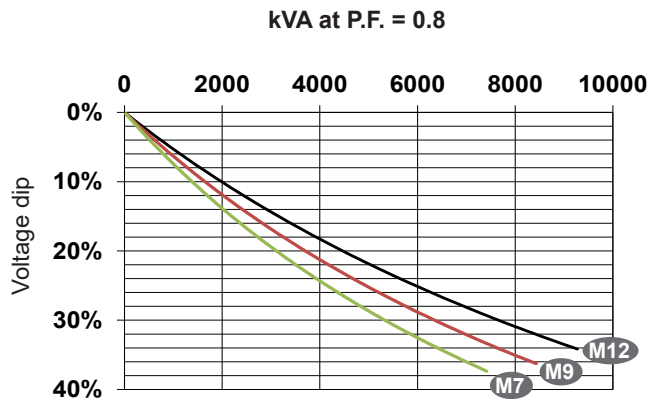
Efficiencies 400V - 50 Hz (— P.F.: 1) (..... P.F.: 0.8)

Reactances (%). Time constants (ms) - Class H / 400V

		M7	M9	M12
Kcc	Short-circuit ratio	0.35	0.36	0.39
Xd	Direct-axis synchronous reactance unsaturated	354	343	314
Xq	Quadrature-axis synchronous reactance unsaturated	181	175	160
T'do	No-load transient time constant	3.21	3.38	3.58
.X'd	Direct-axis transient reactance saturated	33.4	31.9	29.1
T'd	Short-circuit transient time constant	0.356	0.370	0.39
X''d	Direct-axis subtransient reactance saturated	19.4	18.3	16.6
T''d	Subtransient time constant	0.024	0.023	0.023
X''q	Quadrature-axis subtransient reactance saturated	20.2	19.1	17.3
X0	Zero sequence reactance	4.6	4.3	3.9
X2	Negative sequence reactance saturated	19.8	18.7	17.0
Ta	Armature time constant	0.045	0.044	0.044

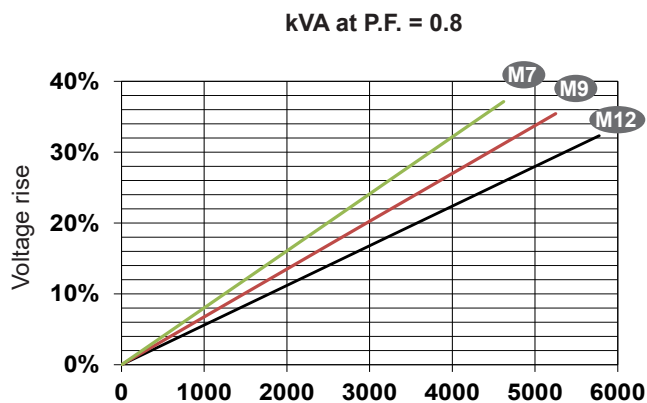
Other class H / 400V data

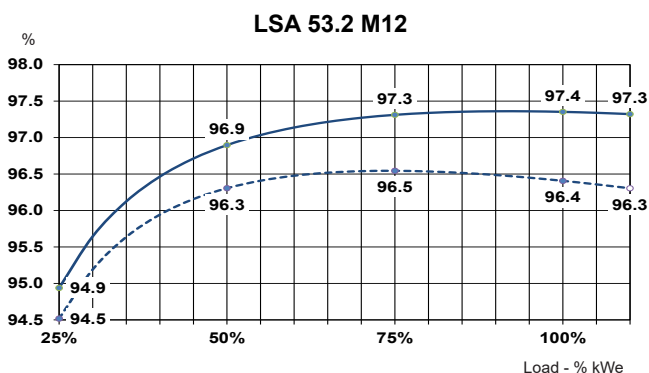
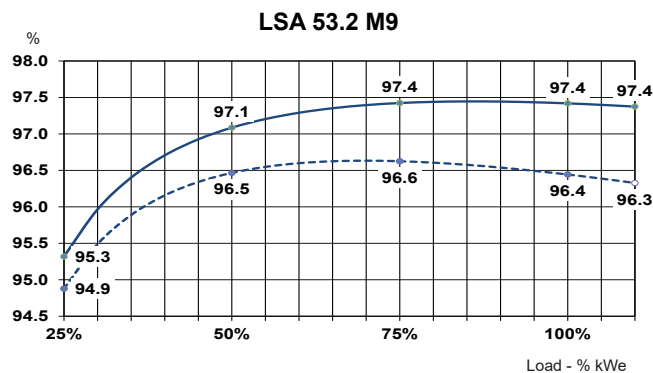
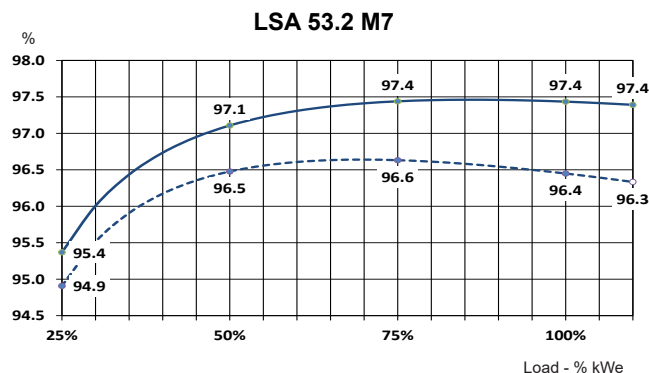
io (A)	No-load excitation current	1.3	1.3	1.3
ic (A)	On-load excitation current	5.3	5.2	4.9
uc (V)	On-load excitation voltage	63	61	58
kW	No-load losses	21	24	29
kW	Heat dissipation	90	101	110

Transient voltage variation at load inrush: 400V - 50 Hz



Transient voltage variation at load rejection: 400V - 50 Hz



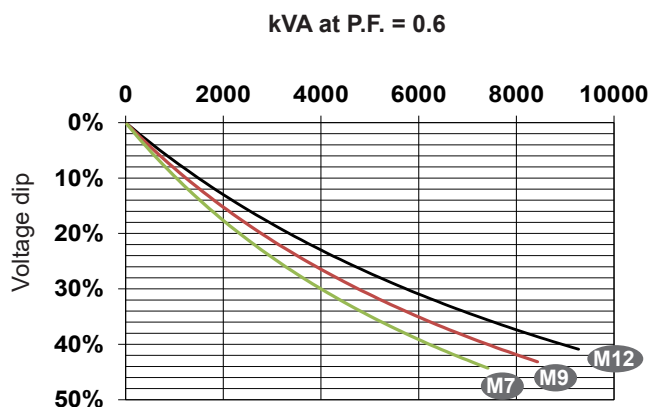
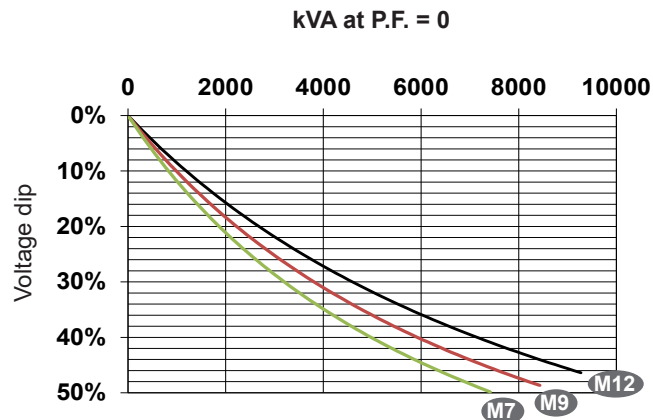
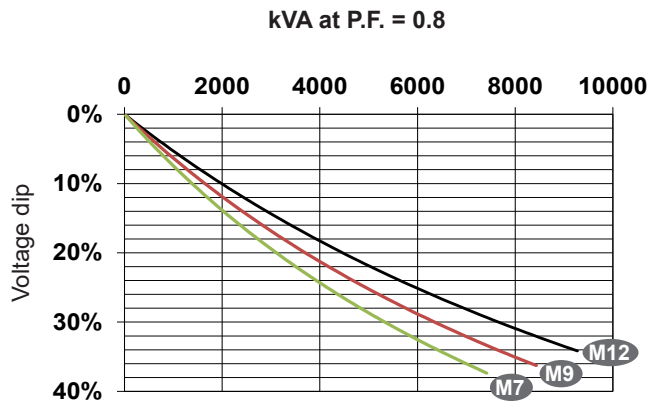
Efficiencies 480V - 60 Hz (— P.F.: 1) (----- P.F.: 0.8)

Reactances (%). Time constants (ms) - Class H / 480V

		M7	M9	M12
Kcc	Short-circuit ratio	0.35	0.36	0.40
Xd	Direct-axis synchronous reactance unsaturated	351	343	310
Xq	Quadrature-axis synchronous reactance unsaturated	179	175	158
T'do	No-load transient time constant	3.21	3.38	3.58
X'd	Direct-axis transient reactance saturated	33.1	31.9	28.6
T'd	Short-circuit transient time constant	0.356	0.370	0.388
X''d	Direct-axis subtransient reactance saturated	19.2	18.3	16.3
T''d	Subtransient time constant	0.024	0.023	0.023
X''q	Quadrature-axis subtransient reactance saturated	20.1	19.1	17.1
X0	Zero sequence reactance	4.5	4.3	3.8
X2	Negative sequence reactance saturated	19.6	18.7	16.7
Ta	Armature time constant	0.043	0.042	0.042

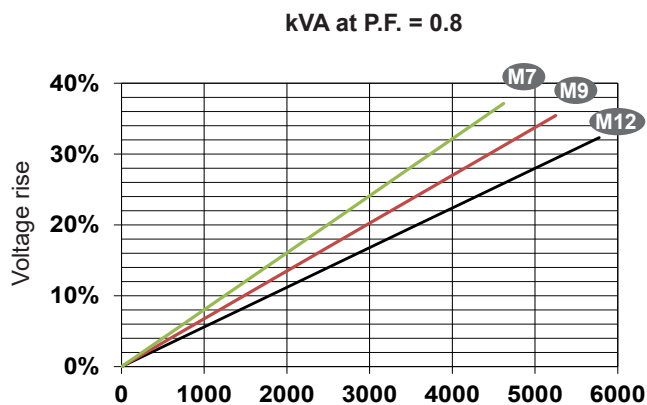
Other class H / 480V data

io (A)	No-load excitation current	1.2	1.3	1.3
ic (A)	On-load excitation current	5.2	5.1	4.8
uc (V)	On-load excitation voltage	61	60	56
kW	No-load losses	29	24	39
kW	Heat dissipation	98	112	123

Transient voltage variation at load inrush: 480V - 60 Hz

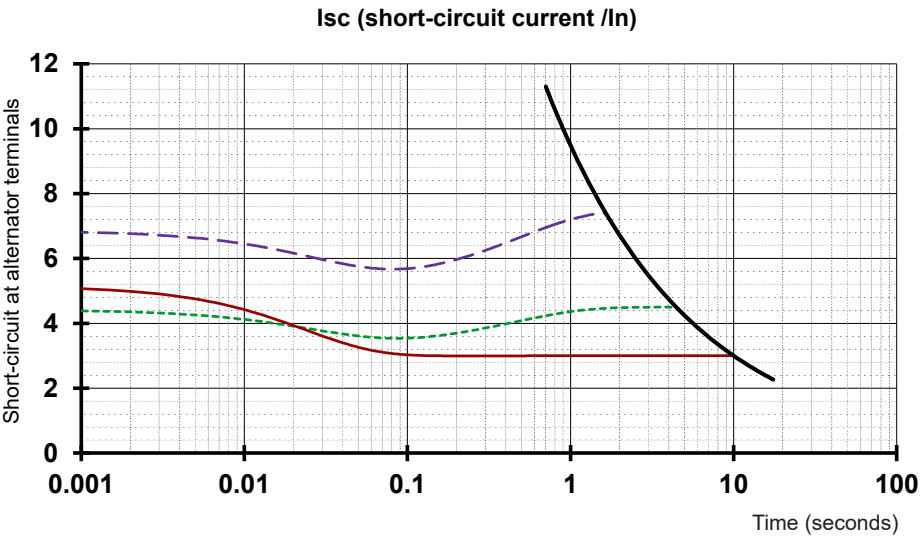


Transient voltage variation at load rejection: 480V - 60 Hz

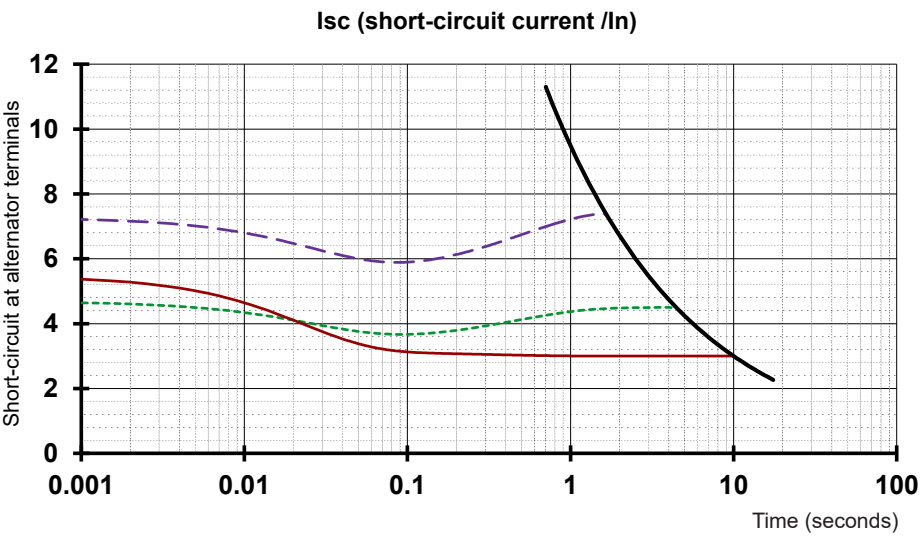


Short-circuit curves at rated speed (star connection Y)

LSA 53.2 M7



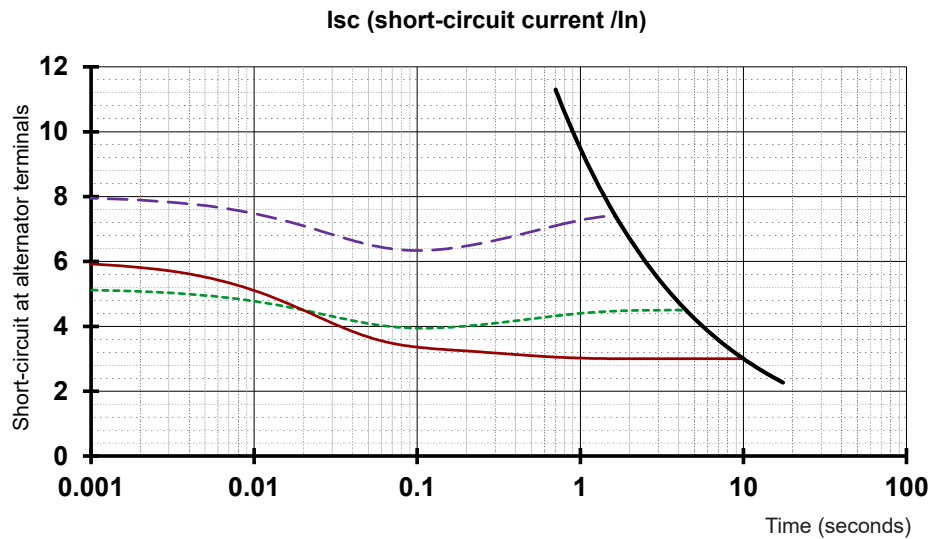
LSA 53.2 M9



- Symmetrical phase to neutral short-circuit
- - Symmetrical two-phase short-circuit
- Symmetrical three-phase short-circuit
- Thermal limit curve

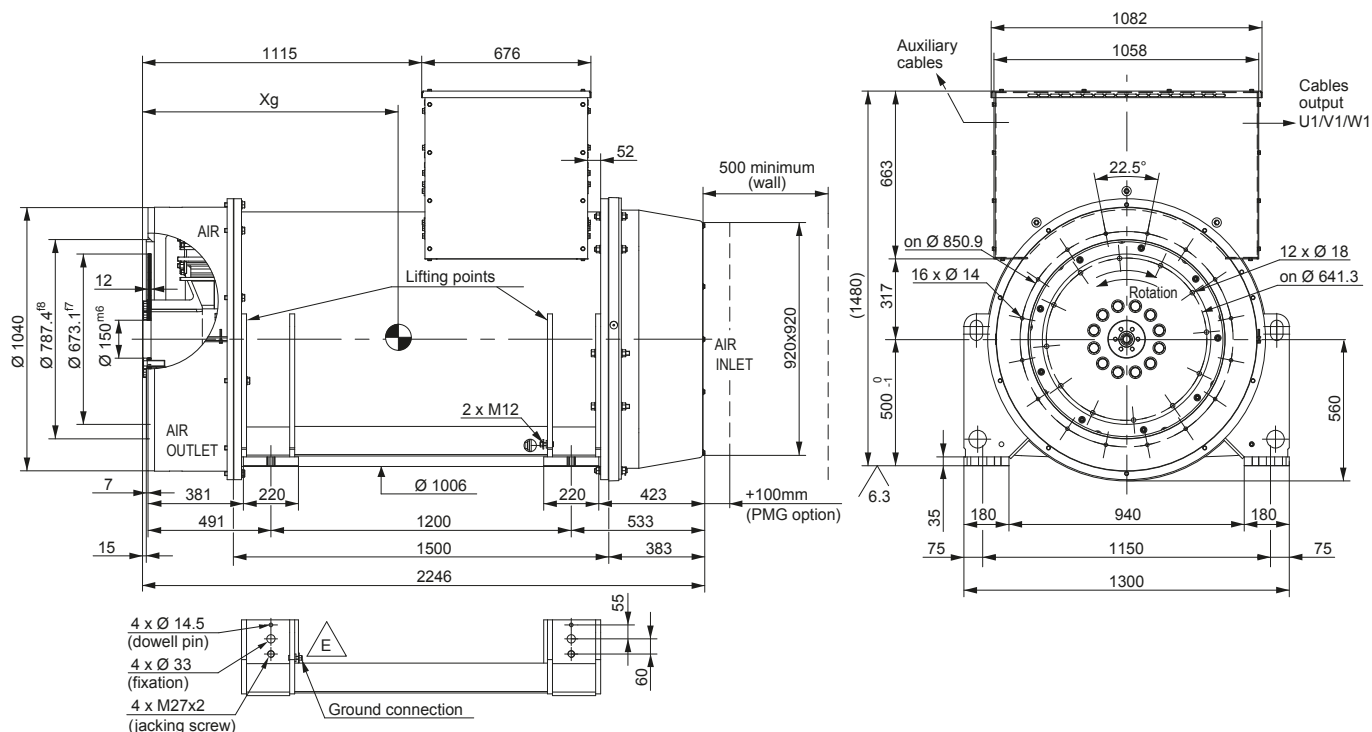
Short-circuit curves at rated speed (star connection Y)

LSA 53.2 M12



- — — Symetrical phase to neutral short-circuit
- - - Symetrical two-phase short-circuit
- — — Symetrical three-phase short-circuit
- — — Thermal limit curve

Single bearing dimensions



Dimensions (mm) and weight

Type	Xg	Weight (kg)
LSA 53.2 M7	942	5250
LSA 53.2 M9	969	5700
LSA 53.2 M12	1010	6300

Coupling

Flange S.A.E.	0	00
Flex plate S.A.E. 21		X
Flex plate S.A.E. 18	X	X

3D drawing files available - Do not hesitate to contact us.

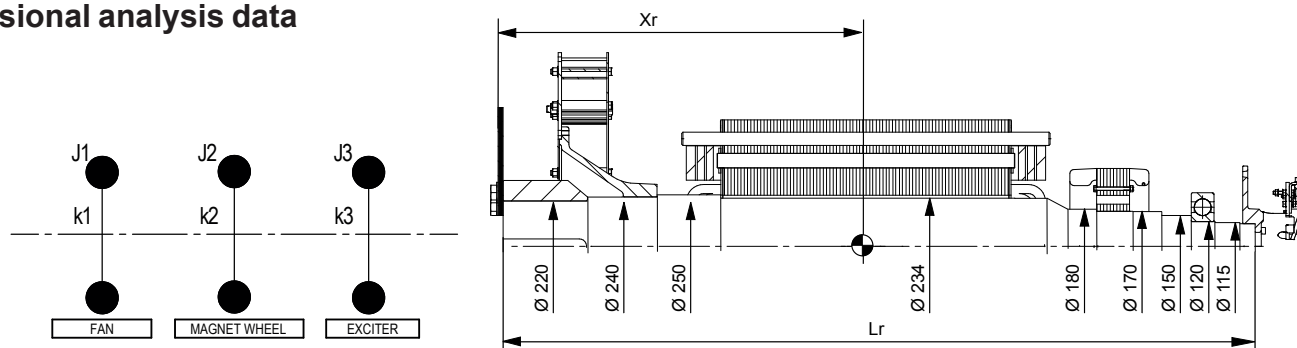
Flange (mm)

S.A.E.	N	M	XBG	S
0	647.7	679.5	16	14
00	787.4	850.9	16	14

Flex plate (mm)

S.A.E.	BX	U	X	Y	AH
21	673.1	641.3	12	18	0
18	571.5	542.9	6	18	15.8

Torsional analysis data



Centre of gravity: Xr (mm), Rotor length: Lr (mm), Weight: M (kg)

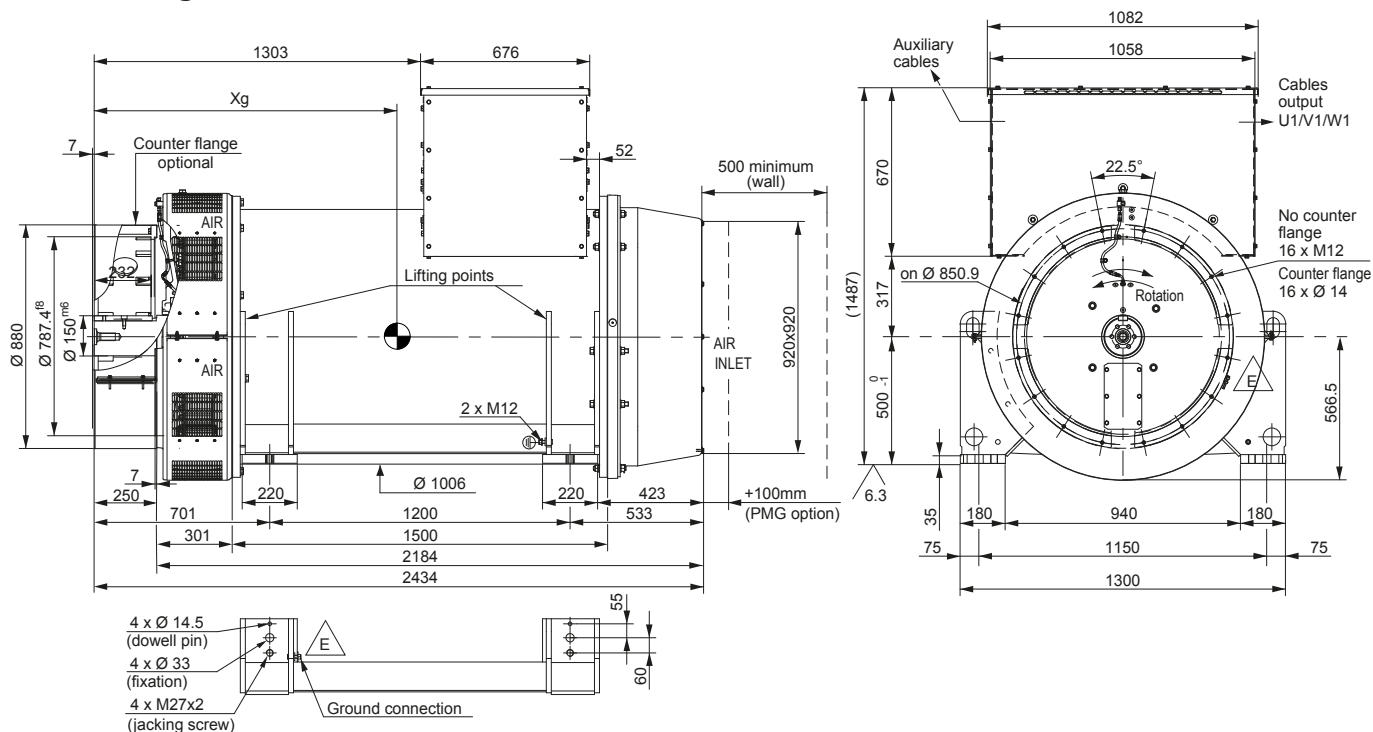
Type	Xg	Lr	M
LSA 53.2 M7	841	2056	2024
LSA 53.2 M9	874	2056	2187
LSA 53.2 M12	924	2056	2415

Torsional rigidity

[Nm/rad]			(kg.m²)		
k1	k2	k3	J1	J2	J3
6.44 10E7	6.58 10E7	2.53 10E7	14.1	62.5	2.1
6.44 10E7	6.02 10E7	2.72 10E7	14.1	71.3	2.0
6.44 10E7	5.38 10E7	3.05 10E7	14.1	83.6	1.8

NOTE: Dimensions are for information only and may be subject to modifications. Contractual 2D drawings and 3D drawing files are available and can be downloaded from the site: www.leroy-somer.com/epg. The torsional analysis of the transmission is the responsibility of genset manufacturer.

Two bearing dimensions

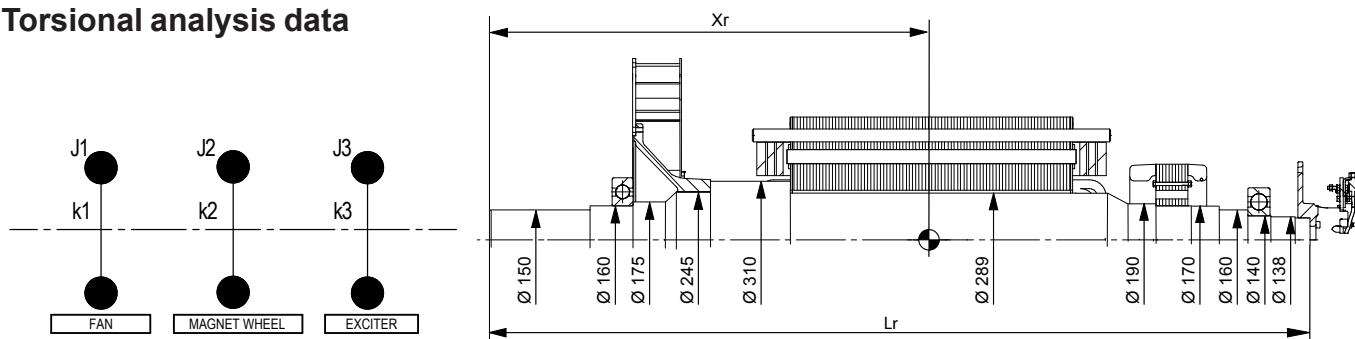


Dimensions (mm) and weight

Type	Xg	Weight (kg)
LSA 53.2 M7	1123	5300
LSA 53.2 M9	1150	5750
LSA 53.2 M12	1192	6400

3D drawing files available - Do not hesitate to contact us.

Torsional analysis data



Centre of gravity: Xr (mm), Rotor length: Lr (mm), Weight: M (kg)

Type	Xr	Lr	M
LSA 53.2 M7	1072	2224	1906
LSA 53.2 M9	1103	2224	2069
LSA 53.2 M12	1152	2224	2297

Torsional rigidity

[Nm/rad]			(kg.m ²)		
k1	k2	k3	J1	J2	J3
1.94 10E7	6.58 10E7	2.53 10E7	10.8	62.5	2.1
1.94 10E7	6.02 10E7	2.72 10E7	10.8	71.3	2.0
1.94 10E7	5.38 10E7	3.05 10E7	10.8	83.6	1.8

NOTE: Dimensions are for information only and may be subject to modifications. Contractual 2D drawings and 3D drawing files are available and can be downloaded from the site: www.leroy-somer.com/epg. The torsional analysis of the transmission is the responsibility of genset manufacturer.

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All for dreams

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