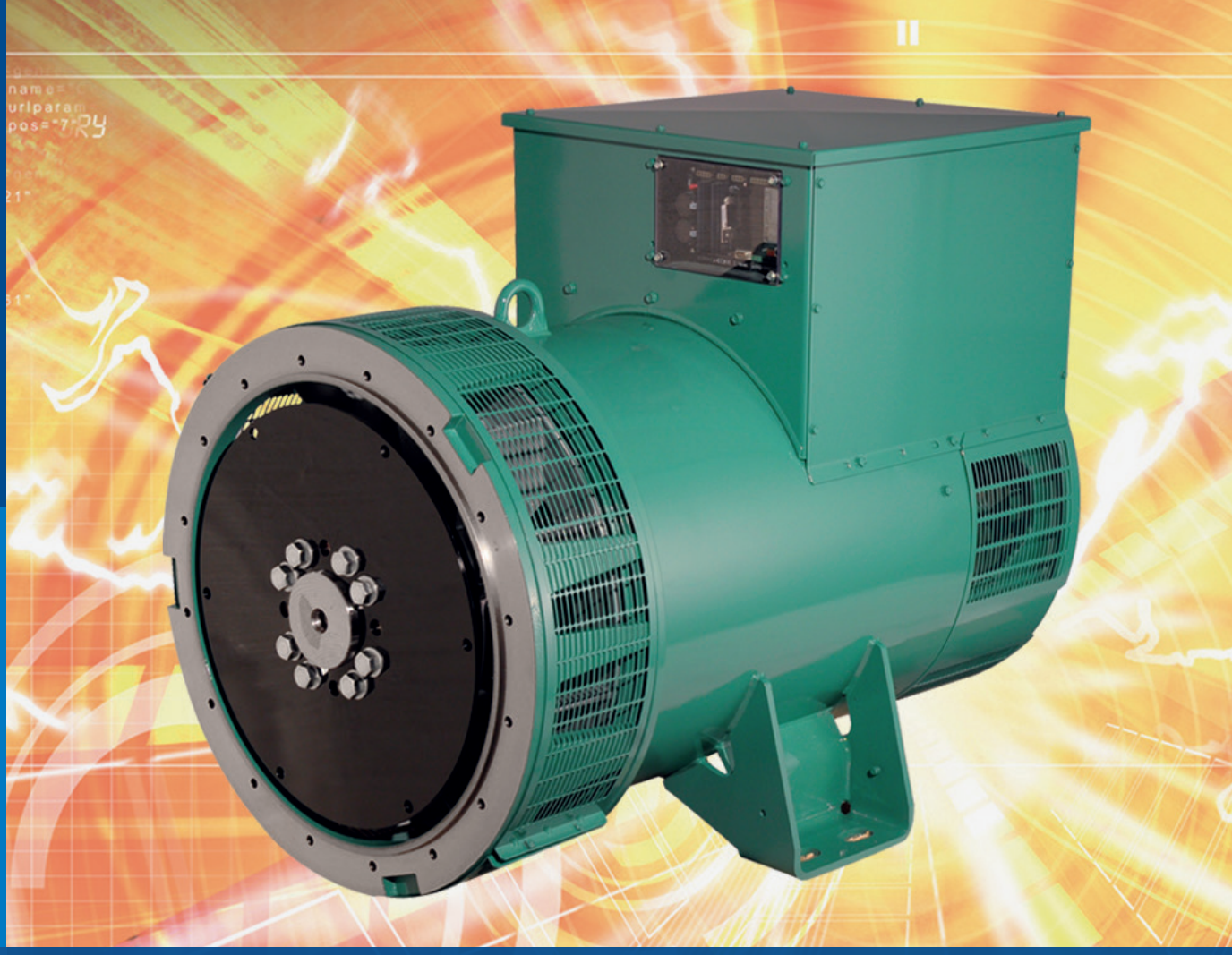


Low Voltage Alternators - 4 pole

LSA 49.3

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

Leroy-Somer™

EMERSON™

Low Voltage Alternators - 4 pole

LSA 49.3 - 660 to 1000 kVA - 50 Hz / 825 to 1250 kVA - 60 Hz

Specially adapted to applications

The LSA 49.3 alternator is designed to be suitable for typical generator applications, such as: backup, marine applications, rental, telecommunications, etc.

Compliant with international standards

The LSA 49.3 alternator conforms to the main international standards and regulations:
- IEC 60034, NEMA MG 1.32-33, ISO 8528-3, CSA C22.2 n°100-14, UL 1446 (UL 1004 on request), marine regulations, etc.

It can be integrated into a CE marked generator.
The LSA 49.3 is designed, manufactured and marketed in an ISO 9001 and ISO 14001 environment.

Top of the range electrical performance

- Class H insulation.
- Standard 6-wire re-connectable winding, 2/3 pitch, type no. 6S (12-wire on request).
- Voltage range 50 Hz: 380V - 400V - 415V and 220V - 230V - 240V.
- Voltage range 60 Hz: 380V - 416V - 440V - 480V and 220V - 240V.
- High efficiency and motor starting capacity.
- Other voltages are possible with optional adapted windings:
  - 50 Hz : 440 V (n° 7), 500 V (n° 9), 600 V (n° 22 or 23), 690 V (n° 10 or 52).
  - 60 Hz : 380 V and 416 V (n° 8), 600 V (n° 9).
- R 791 interference suppression conforming to standard EN 61000-6-3, EN 61000-6-2, EN 55011 group 1 class B standard for European zone (CE marking).

Excitation and regulation system suited to the application

Excitation system			Regulation options			
Volage regulator	**AREP**	**PMG** (option)	**C.T.** Current transformer for paralleling	Mains paralleling	3-phase sensing	Remote voltage potentiometer
R450 M	**Standard**	**Standard**	√	**-**	**-**	√
R450 T	**Option**	**Option**	√	**Included**	**Included**	√
D510 C	**Option**	**Option**	√	**Included**	**Included**	√

√ : possible mounting

Protection system suited to the environment

- The LSA 49.3 is IP 23.
- Standard winding protection for clean environments with relative humidity ≤ 95 %, including indoor marine environments.

Options :
- Filters on air inlet : derating 5%.
- Filters on air inlet and air outlet (IP 44) : derating 10%.
- Winding protections for harsh environments and relative humidity greater than 95%.
- Space heaters.
- Thermal protection for winding and shields.

Reinforced mechanical structure using finite element modelling

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

Accessible terminal box proportioned for optional equipment

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

Low Voltage Alternators - 4 pole

LSA 49.3 - 660 to 1000 kVA - 50 Hz / 825 to 1250 kVA - 60 Hz

General characteristics

Insulation class	H	Excitation system	AREP
Winding pitch	2/3 (winding 6S)	AVR type	R 450 M
Number of wires	6 (12 option)	Voltage regulation (*)	± 0.5 %
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 min^{-1}	Waveform: NEMA = TIF (**)	< 50
Air flow	1 m^3/s (50Hz) / 1.2 m^3/s (60Hz)	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					220V				220V				220V				220V
49.3 S4	kVA	-	**660**	-	620	-	**595**	-	560	-	**725**	-	685	-	**745**	-	715
	kW	-	*528*	-	*496*	-	*476*	-	*448*	-	*580*	-	*548*	-	*596*	-	*572*
49.3 M6	kVA	-	**730**	-	665	-	**660**	-	600	-	**780**	-	730	-	**810**	-	765
	kW	-	*584*	-	*532*	-	*528*	-	*480*	-	*624*	-	*584*	-	*648*	-	*612*
49.3 M8	kVA	-	**820**	-	810	-	**760**	-	710	-	**910**	-	885	-	**945**	-	925
	kW	-	*656*	-	*648*	-	*608*	-	*568*	-	*728*	-	*708*	-	*756*	-	*740*
49.3 L9	kVA	-	**910**	-	820	-	**820**	-	740	-	**1000**	-	920	-	**1020**	-	965
	kW	-	*728*	-	*656*	-	*656*	-	*592*	-	*800*	-	*736*	-	*816*	-	*772*
49.3 L10	kVA	-	**1000**	-	950	-	**900**	-	840	-	**1085**	-	1030	-	**1130**	-	1080
	kW	-	*800*	-	*760*	-	*720*	-	*672*	-	*868*	-	*824*	-	*904*	-	*864*

Ratings 60 Hz - 1800 R.P.M.

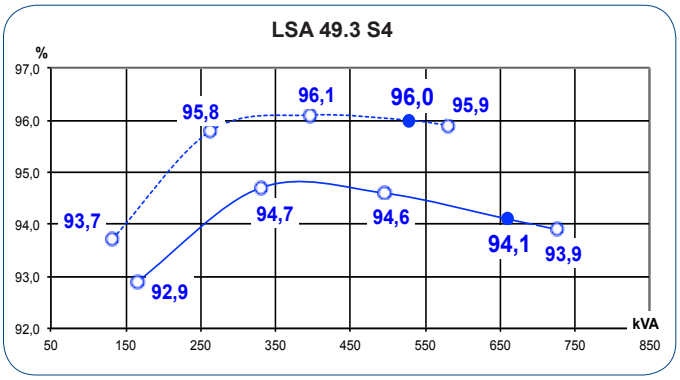
kVA / kW - P.F. = 0.8

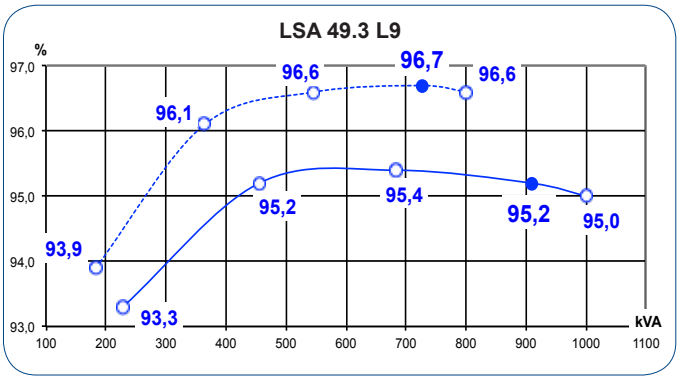
Duty/T°C		Continuous duty/40°C				Continuous duty/40°C				Stand-by/40°C				Stand-by/27°C			
Class/T°K		H/125°K				F/105°K				H/150°K				H/163°K			
Phase		**3 ph.**				**3 ph.**				**3 ph.**				**3 ph.**			
Y		380V	416V	440V	480V	380V	416V	440V	480V	380V	416V	440V	480V	380V	416V	440V	480V
Δ		220V	240V			220V	240V			220V	240V			220V	240V		
YY			208V	220V	240V		208V	220V	240V		208V	220V	240V		208V	220V	240V
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*
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*
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*
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*
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*

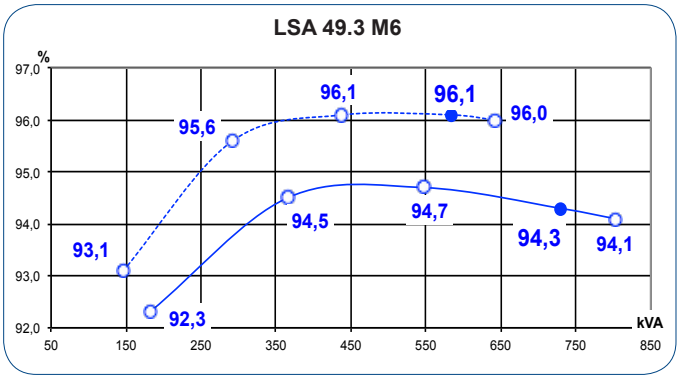
Low Voltage Alternators - 4 pole

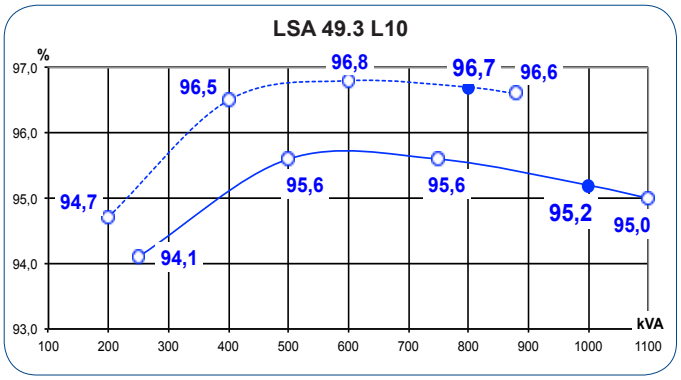
LSA 49.3 - 660 to 1000 kVA - 50 Hz / 825 to 1250 kVA - 60 Hz

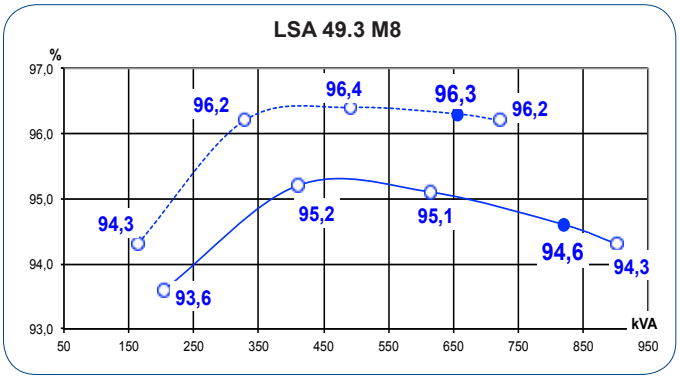
Efficiencies 400V - 50 Hz (····· P.F.: 1) (— P.F.: 0.8)







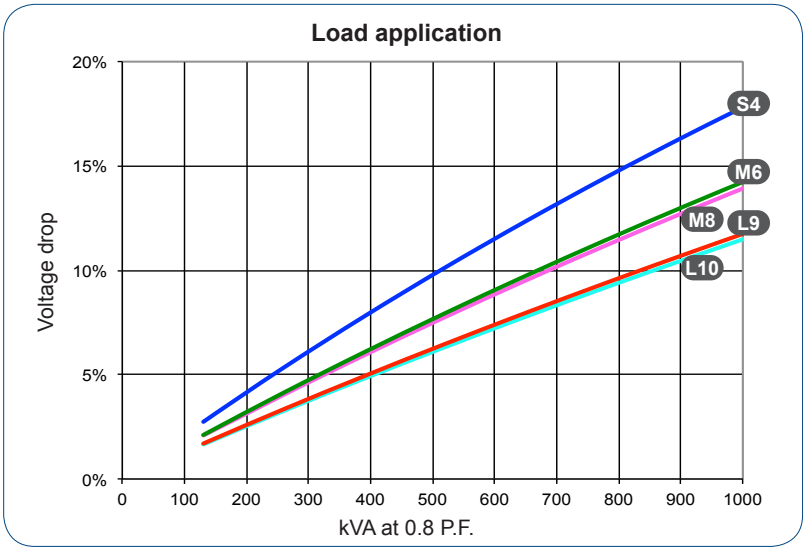


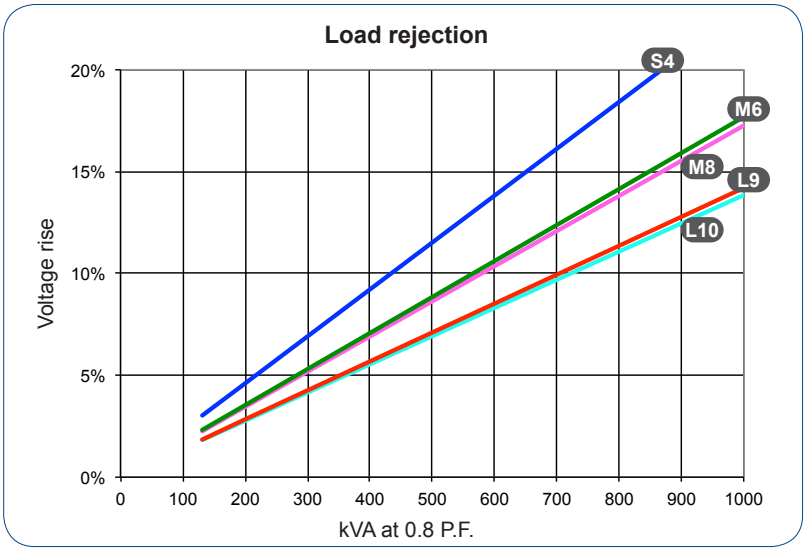


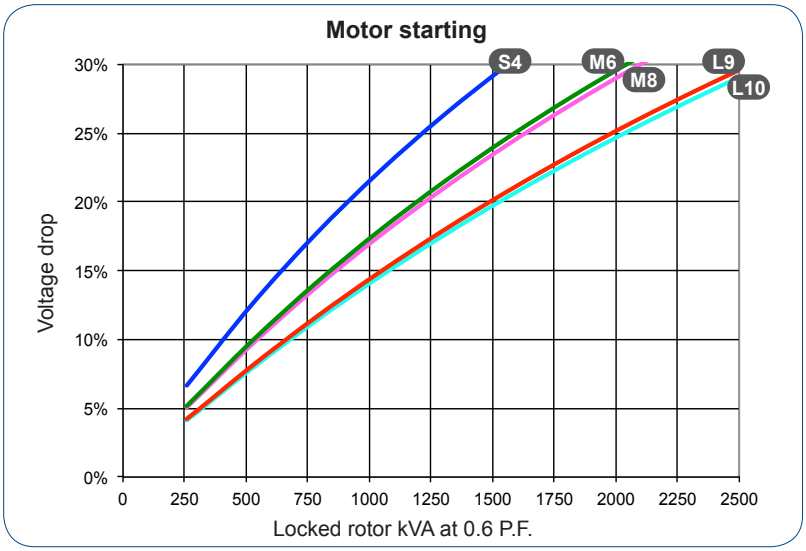
Reactances (%). Time constants (ms) - Class H / 400 V

		S4	M6	M8	L9	L10
Kcc	Short-circuit ratio	0.36	0.42	0.34	0.47	0.38
Xd	Direct-axis synchro. reactance unsaturated	350	294	348	303	348
Xq	Quadrature-axis synchro. reactance unsaturated	210	176	209	182	209
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	14.0	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 unsaturated	0.35	0.48	0.61	0.78	0.33
X2	Negative sequence reactance saturated	15.2	12.1	14.1	11.9	13.5
Ta	Armature time constant	15	15	15	15	15
Other class H / 400 V data						
io (A)	No-load excitation current	1.1	1	1	1	1
ic (A)	On-load excitation current	4.2	4.1	3.8	3.7	3.8
uc (V)	On-load excitation voltage	57	55	51	49	51
ms	Response time (ΔU = 20% transient)	500	500	500	500	500
kVA	Start (ΔU = 20% cont. or 30% trans.)	1350	1452	1708	2211	2211
%	Transient ΔU (on-load 4/4) - P.F.: 0.8 $_{LAG}$	13	11	12	11	12
W	No-load losses	8233	10288	9226	11189	10343
W	Heat dissipation	32519	34995	37082	36425	39772

Transient voltage variation 400V - 50 Hz
AREP or PMG system





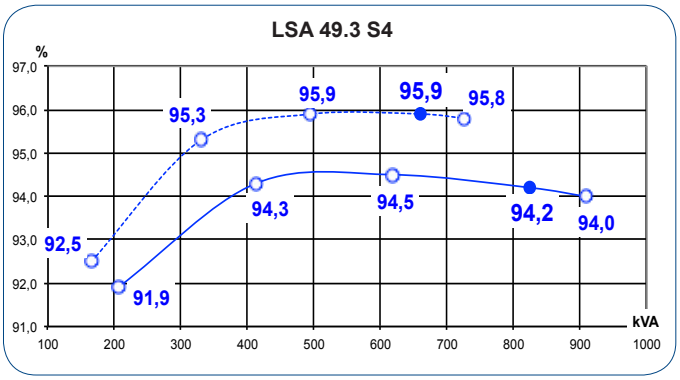


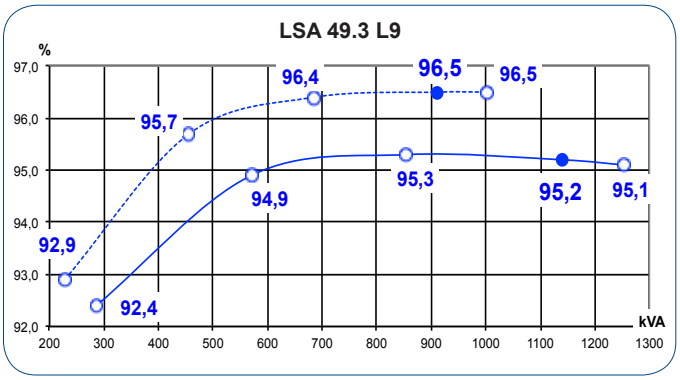
1) For a starting P.F. other than 0.6, the starting kVA must be multiplied by K = Sine P.F. / 0.8
2) For voltages other than 400V (Y), 230V (Δ) at 50 Hz, then kVA must be multiplied by $(400/U)^2$ or $(230/U)^2$.

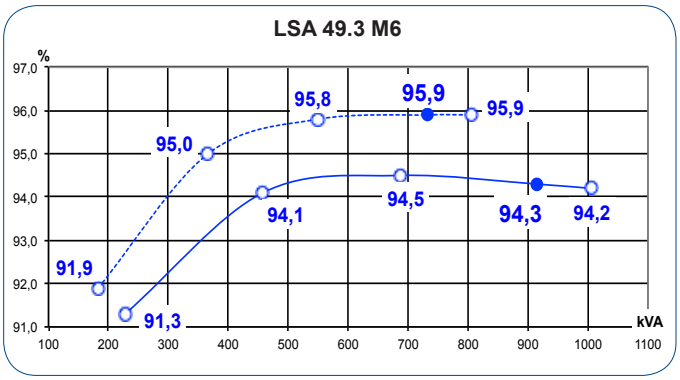
Low Voltage Alternators - 4 pole

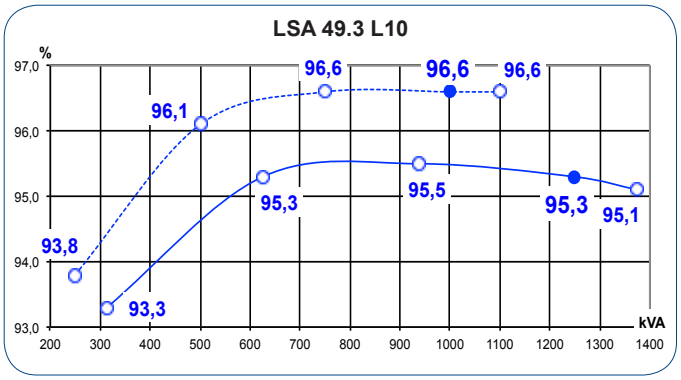
LSA 49.3 - 660 to 1000 kVA - 50 Hz / 825 to 1250 kVA - 60 Hz

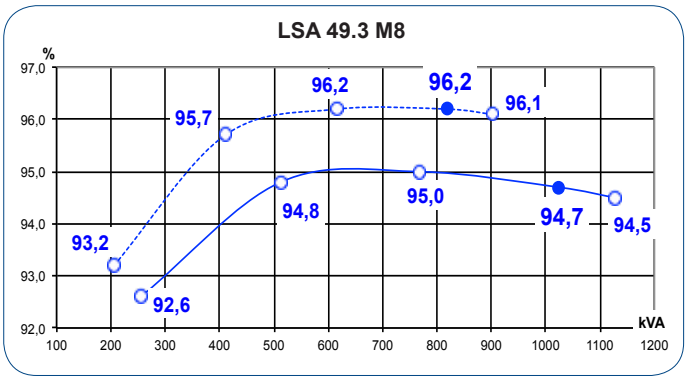
Efficiencies 480V - 60 Hz (····· P.F.: 1) (— P.F.: 0.8)







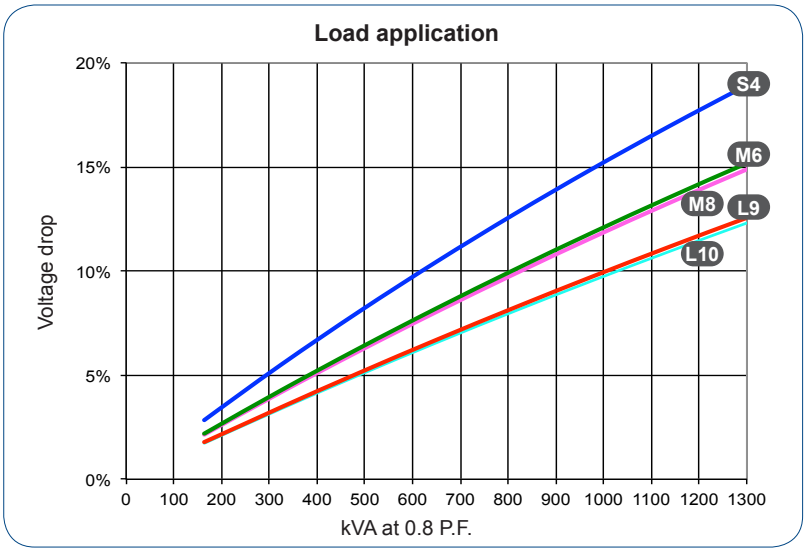


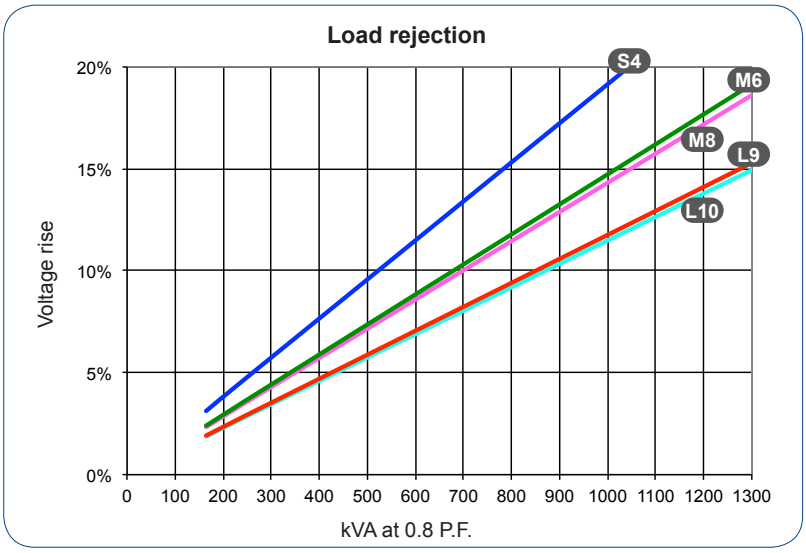


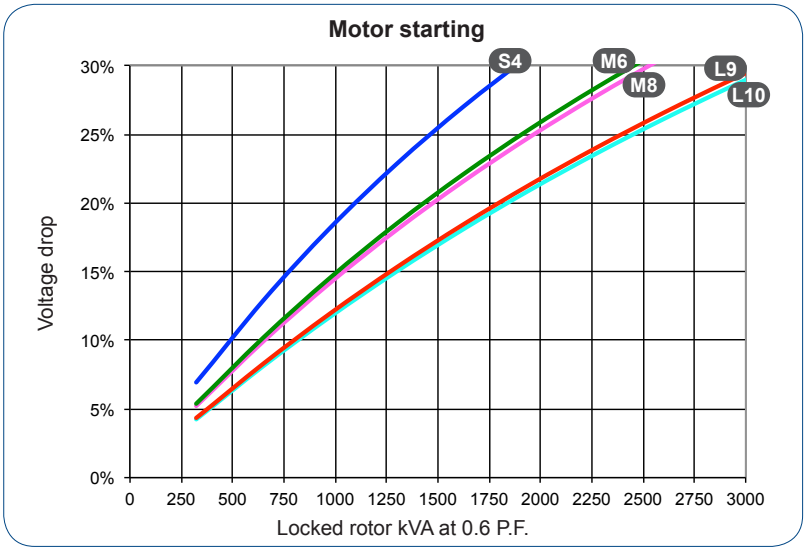
Reactances (%). Time constants (ms) - Class H / 480 V

		S4	M6	M8	L9	L10
Kcc	Short-circuit ratio	0.35	0.40	0.32	0.45	0.36
Xd	Direct-axis synchro. reactance unsaturated	365	307	362	317	363
Xq	Quadrature-axis synchro. reactance unsaturated	219	184	217	190	217
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	17.0	13.4	15.5	13.0	14.7
Xo	Zero sequence reactance unsaturated	0.67	0.46	0.78	0.87	0.96
X2	Negative sequence reactance saturated	15.8	12.6	14.7	12.4	14.1
Ta	Armature time constant	15	15	15	15	15
Other class H / 480 V data						
io (A)	No-load excitation current	1.1	1	1	1	1
ic (A)	On-load excitation current	4.3	4.2	3.8	3.8	3.9
uc (V)	On-load excitation voltage	67	65	60	58	59
ms	Response time (ΔU = 20% transient)	500	500	500	500	500
kVA	Start (ΔU = 20% cont. or 30% trans.)	1616	1747	2071	2646	2646
%	Transient ΔU (on-load 4/4) - P.F.: 0.8 $_{LAG}$	13	11	12	11	12
W	No-load losses	12720	15710	14270	16873	15726
W	Heat dissipation	40028	43671	45867	45528	49172

Transient voltage variation 480V - 60 Hz
AREP or PMG system



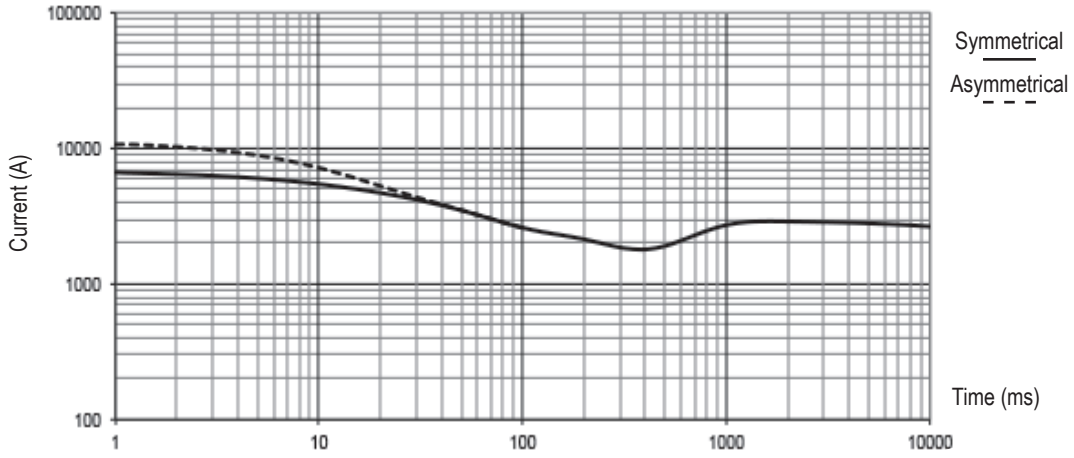




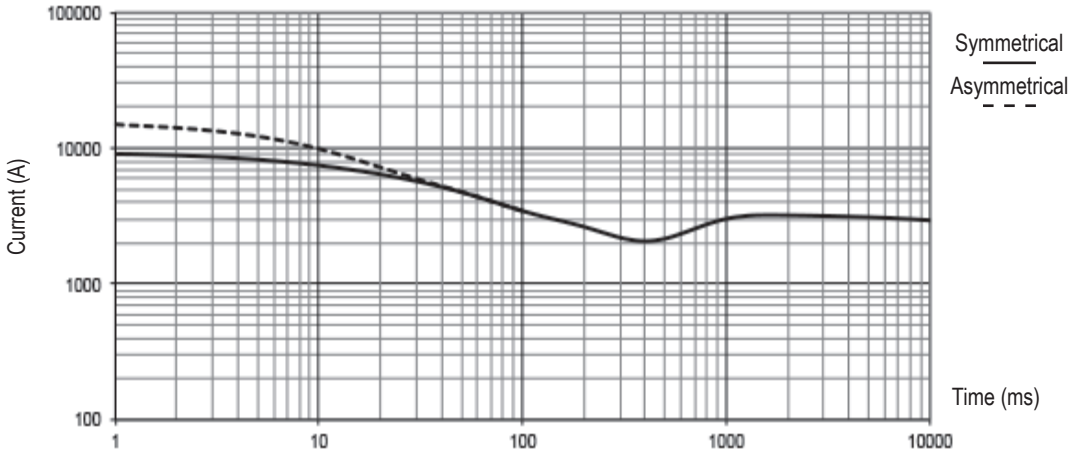
1) For a starting P.F. other than 0.6, the starting kVA must be multiplied by K = Sine P.F. / 0.8
2) For voltages other than 480V (Y), 277V (Δ), 240V (YY) at 60 Hz, then kVA must be multiplied by $(480/U)^2$ or $(277/U)^2$ or $(240/U)^2$.

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

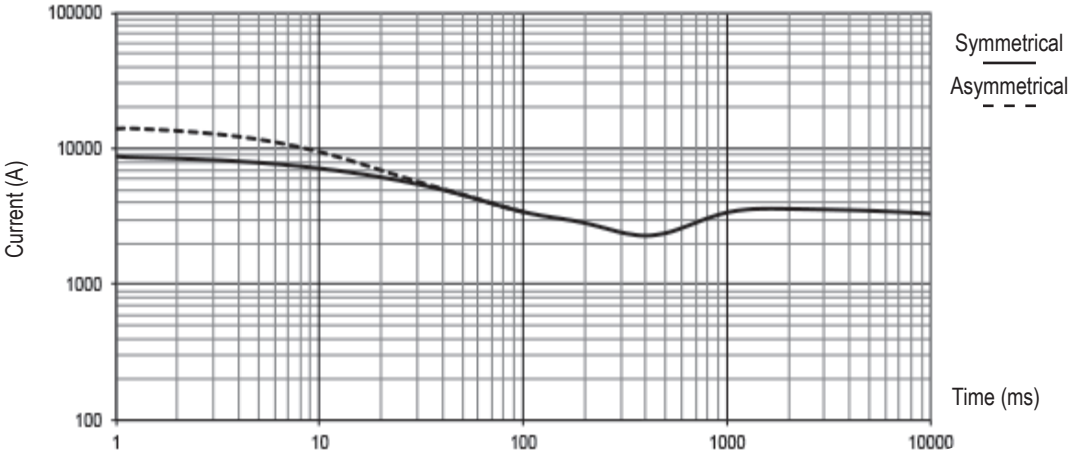
LSA 49.3 S4



LSA 49.3 M6



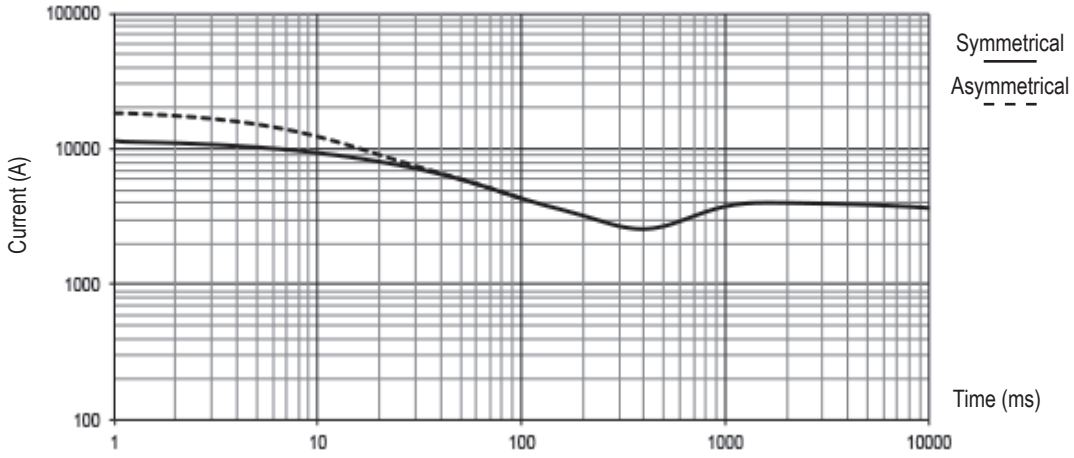
LSA 49.3 M8



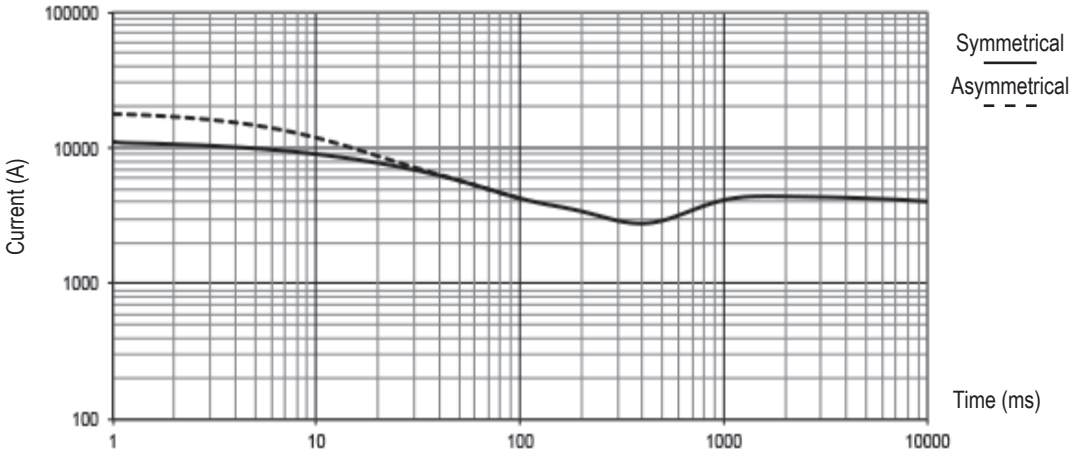
Influence due to connection
Curves shown are for star (Y) connection.
For other connections, use the following multiplication factors:
- Series delta : current value x 1.732 - Parallel star : current value x 2

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

LSA 49.3 L9



LSA 49.3 L10



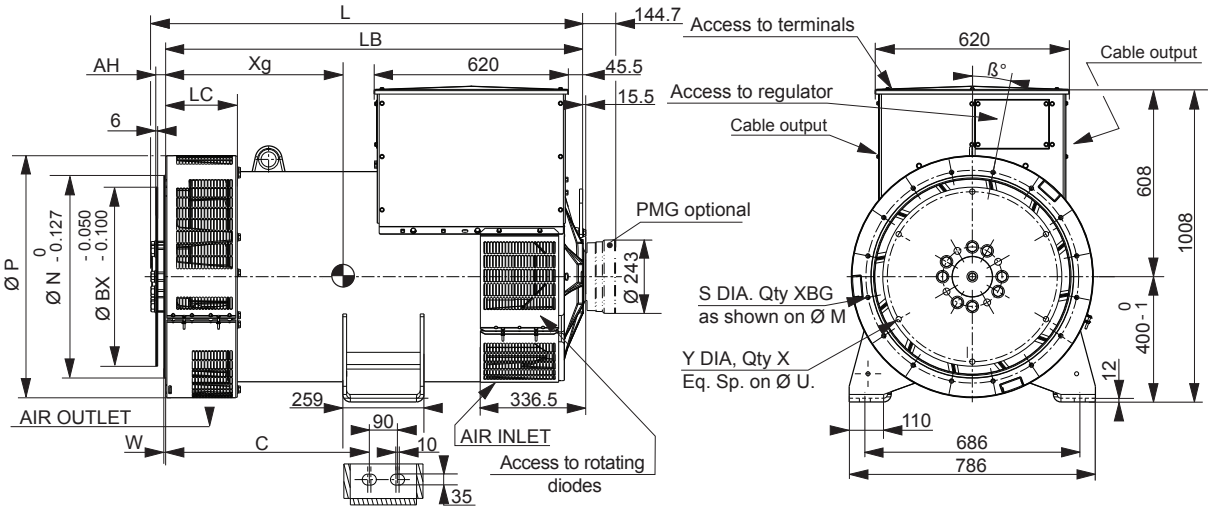
Influence due to short-circuit
Curves are based on a three-phase short-circuit.
For other types of short-circuit, use the following multiplication factors.

	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.

Low Voltage Alternators - 4 pole

LSA 49.3 - 660 to 1000 kVA - 50 Hz / 825 to 1250 kVA - 60 Hz

Single bearing dimensions



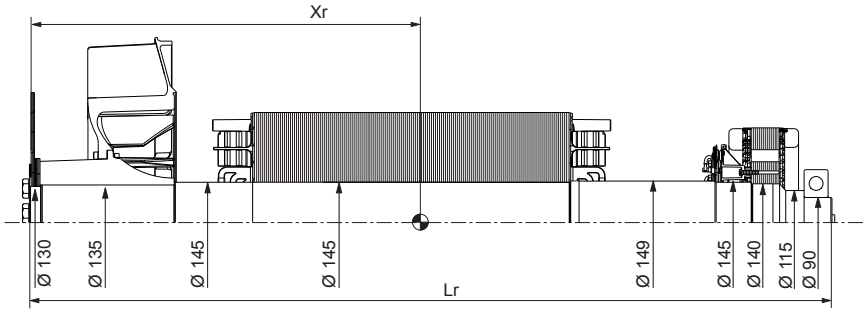
Dimensions (mm) and weight					
Type	L without PMG	LB	C	Xg	Weight (kg)
LSA 49.3 S4	1282	1241	560	590	1427
LSA 49.3 M6	1372	1331	650	629	1574
LSA 49.3 M8	1372	1331	650	636	1635
LSA 49.3 L9	1462	1421	650	673	1788
LSA 49.3 L10	1462	1421	650	681	1837

Coupling		
Flex plate	14	18
Flange S.A.E 1	X	
Flange S.A.E 1/2	X	
Flange S.A.E 0	X	X
Flange S.A.E 00		X

Flange (mm)								
S.A.E.	P	N	M	LC	XBG	S	W	ß°
1	773	511.175	530.225	228.5	12	12	6	15°
1/2	773	584.2	619.125	228.5	12	14	6	15°
0	773	647.7	679.45	228.5	16	14	6	11° 15'
00	883	787.4	850.9	245	16	14	7	11°15'

Flex plate (mm)					
S.A.E.	BX	U	X	Y	AH
14	466.7	438.15	8	14	25.4
18	571.5	542.92	6	17	15.7

Torsional analysis data



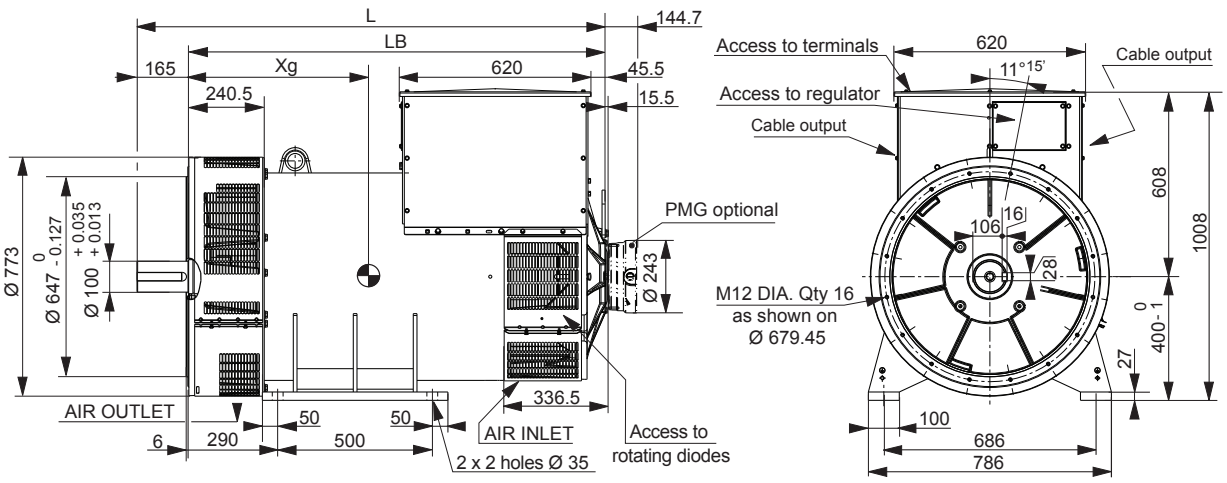
Centre of gravity: Xr (mm), Rotor length: Lr (mm), Weight: M (kg), Moment of inertia: J (kgm²): (4J = MD²)								
	Flange S.A.E. 14				Flange S.A.E. 18			
Type	Xr	Lr	M	J	Xr	Lr	M	J
LSA 49.3 S4	579	1255	535	8.39	567	1255	535	8.65
LSA 49.3 M6	620	1345	596	9.49	604	1345	598	9.75
LSA 49.3 M8	628	1345	622	10.04	612	1345	624	10.30
LSA 49.3 L9	666	1435	678	11	654	1435	680	11.27
LSA 49.3 L10	676	1435	695	11.36	662	1435	697	11.62

NOTE : Dimensions are for information only and may be subject to modifications. Contractuel 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.

Low Voltage Alternators - 4 pole

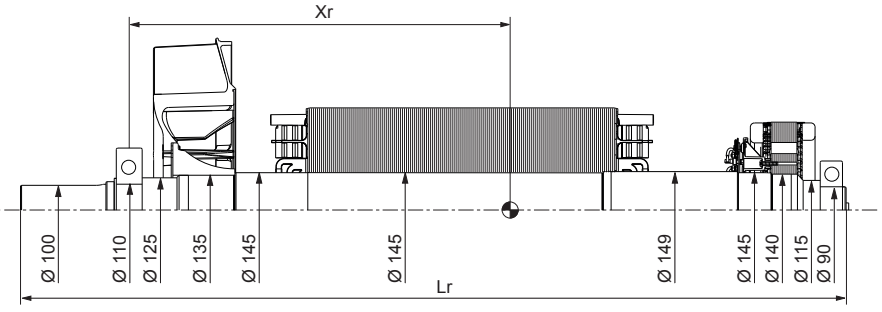
LSA 49.3 - 660 to 1000 kVA - 50 Hz / 825 to 1250 kVA - 60 Hz

Two bearing dimensions



Dimensions (mm) and weight				
Type	L without PMG	LB	Xg	Weight (kg)
LSA 49.3 S4	1378	1213	596	1483
LSA 49.3 M6	1468	1303	636	1616
LSA 49.3 M8	1468	1303	643	1677
LSA 49.3 L9	1558	1393	682	1829
LSA 49.3 L10	1558	1393	688	1878

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	538	1409	506	7.96
LSA 49.3 M6	578	1499	568	9.07
LSA 49.3 M8	585	1499	594	9.62
LSA 49.3 L9	621	1589	650	10.58
LSA 49.3 L10	629	1589	667	10.94

NOTE : Dimensions are for information only and may be subject to modifications. Contractuel 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.

EMERSON. CONSIDER IT SOLVED.™

www.emerson.com/epg

Moteurs Leroy-Somer SAS. Headquarters: Bd Marcellin Leroy, CS 10015, 16915 Angoulême Cedex 9, France. Share Capital: 65 800 512 €, RCS Angoulême 338 567 258.

Leroy-Somer™

EMERSON™

5279 en - 2016.01 / d