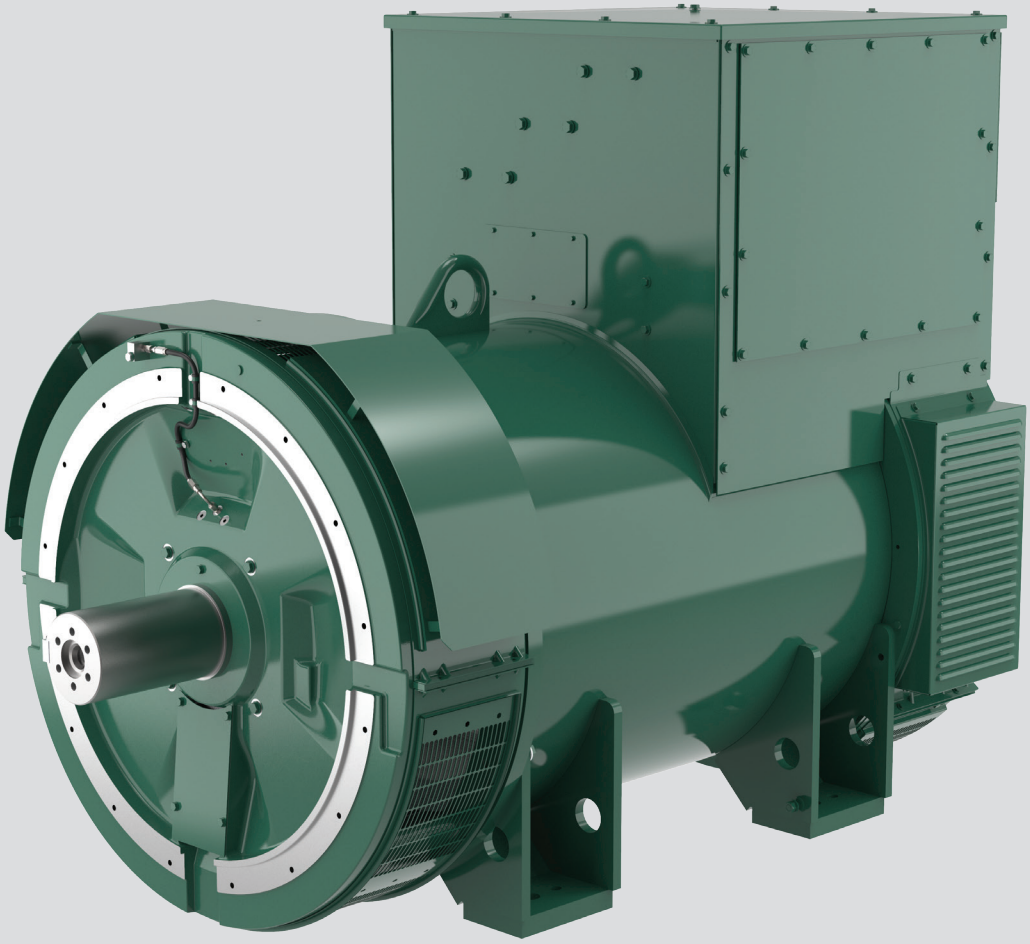


LSA 52.3

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

Specially adapted to applications

The LSA 52.3 alternator is designed to be suitable for typical generator applications, such as: backup, marine applications, rental, telecommunications, etc.

Compliant with international standards

The LSA 52.3 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 EC marked generator.
The LSA 52.3 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 winding, 2/3 pitch, type no. 6S
- Voltage range 50 Hz: 380V - 400V - 415V - 440 V
- Voltage range 60 Hz: 380V - 416V - 440V - 480V
- High efficiency and motor starting capacity
- Other voltages are possible with optional adapted windings
  - 50 Hz : 440 V (no. 7S), 500 V (no. 9S), 600 V (no. 22S or 23S), 690 V (no. 10S or 52S)
  - 60 Hz : 380 V and 416 V (no. 8S), 600 V (no. 9S)
- Complies with EN 61000-6-3, EN 61000-6-2, EN 55011, group 1 class B for European zone (EC marking)

Advanced control system

The standard excitation system for the LSA 52.3 is an AREP + PMI auxiliary winding with permanent magnets.
The system is operated by a fully configurable D550 digital automatic voltage regulator.
The system also uses three-phase detection for precise and reactive regulation.

Options:

- Equipment for mains paralleling
- PMG excitation system
- Remote voltage potentiometer

Protection system suited to the environment

- The LSA 52.3 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 8%
  - Winding protections for harsh environments and relative humidity greater than 95%
  - Space heaters
  - Protection or metering CTs
  - Thermal protection for stator windings &/or bearings (PT100)

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
- Regreasable bearings
- Clockwise rotation in standard

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

General characteristics

Insulation class	H
Winding pitch	2/3 (wind. 6S)
Number of wires	6
Protection	IP 23
Altitude	≤ 1000 m
Overspeed	2250 R.P.M.
Air flow	2.5 m³/s (50 Hz) - 2.8 m³/s (60 Hz)

Excitation system	AREP + PMI
AVR type	D550
Voltage regulation (*)	± 0.5%
Short-circuit current	300% (3 IN) : 10s
Total Harmonic Distortion THD (**) in no-load	< 4%
Waveform: NEMA = TIF (**)	< 50
Waveform: I.E.C. = THF (**)	< 2%

(*) steady state (**) between phases

Ratings 50 Hz - 1500 R.P.M.

kVA / kW - P.F. = 0.8

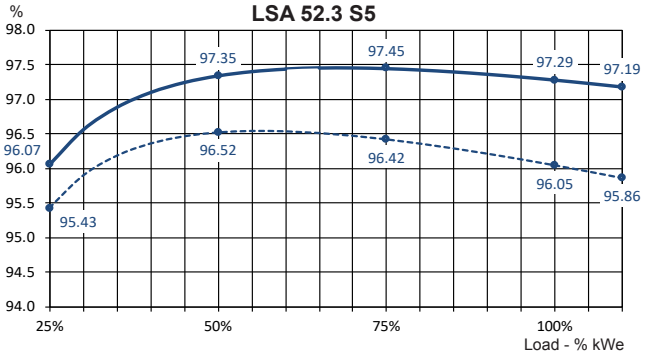
Duty/T°C		Continuous duty/40°C				Continuous duty/40°C				Stand-by/40°C				Stand-by/27°C			
Class/T°K		H/125°K				F/105°K				H/150°K				H/163°K			
Phase		**3 ph.**				**3 ph.**				**3 ph.**				**3 ph.**			
Y		380V	**400V**	415V	440V	380V	**400V**	415V	440V	380V	**400V**	415V	440V	380V	**400V**	415V	440V
LSA 52.3 S5	kVA	1860	**1860**	1860	1691	1696	**1696**	1696	1542	1953	**1953**	1953	1775	2046	**2046**	2046	1860
	kW	*1488*	***1488***	*1488*	*1353*	*1357*	***1357***	*1357*	*1234*	*1562*	***1562***	*1562*	*1420*	*1637*	***1637***	*1637*	*1488*
LSA 52.3 S6	kVA	2000	**2000**	2000	1818	1824	**1824**	1824	1658	2100	**2100**	2100	1909	2200	**2200**	2200	2000
	kW	*1600*	***1600***	*1600*	*1454*	*1459*	***1459***	*1459*	*1326*	*1680*	***1680***	*1680*	*1527*	*1760*	***1760***	*1760*	*1600*
LSA 52.3 S7	kVA	2200	**2200**	2200	2000	2006	**2006**	2006	1824	2310	**2310**	2310	2100	2420	**2420**	2420	2200
	kW	*1760*	***1760***	*1760*	*1600*	*1605*	***1605***	*1605*	*1459*	*1848*	***1848***	*1848*	*1680*	*1936*	***1936***	*1936*	*1760*
LSA 52.3 L9	kVA	2360	**2360**	2360	2145	2152	**2152**	2152	1956	2478	**2478**	2478	2253	2596	**2596**	2596	2360
	kW	*1888*	***1888***	*1888*	*1716*	*1722*	***1722***	*1722*	*1565*	*1982*	***1982***	*1982*	*1802*	*2077*	***2077***	*2077*	*1888*
LSA 52.3 L12	kVA	2560	**2560**	2560	2327	2335	**2335**	2335	2123	2688	**2688**	2688	2444	2816	**2816**	2816	2560
	kW	*2048*	***2048***	*2048*	*1862*	*1868*	***1868***	*1868*	*1698*	*2150*	***2150***	*2150*	*1955*	*2253*	***2253***	*2253*	*2048*
LSA 52.3 UL16	kVA	2750	**2750**	2750	2500	2508	**2508**	2508	2280	2888	**2888**	2888	2625	3025	**3025**	3025	2750
	kW	*2200*	***2200***	*2200*	*2000*	*2006*	***2006***	*2006*	*1824*	*2310*	***2310***	*2310*	*2100*	*2420*	***2420***	*2420*	*2200*

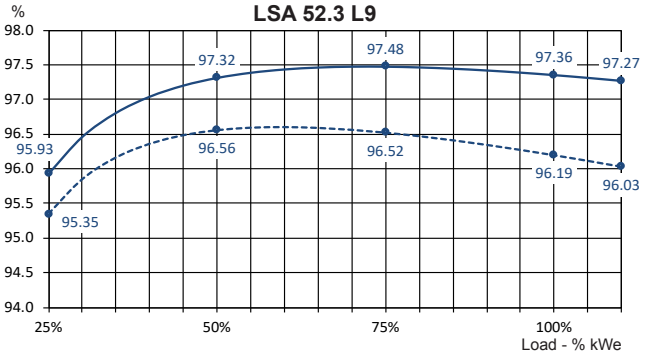
Ratings 60 Hz - 1800 R.P.M.

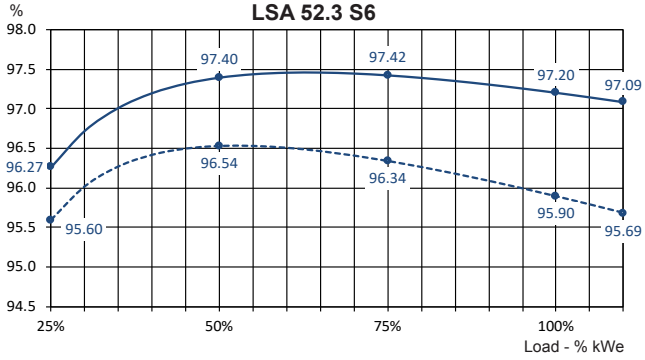
kVA / kW - P.F. = 0.8

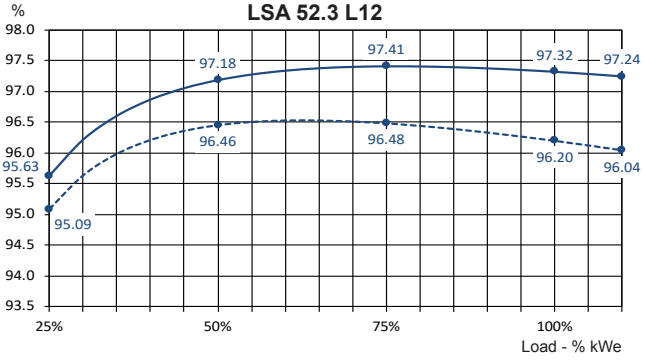
Duty/T°C		Continuous duty/40°C				Continuous duty/40°C				Stand-by/40°C				Stand-by/27°C			
Class/T°K		H/125°K				F/105°K				H/150°K				H/163°K			
Phase		**3 ph.**				**3 ph.**				**3 ph.**				**3 ph.**			
Y		380V	416V	440V	**480V**	380V	416V	440V	**480V**	380V	416V	440V	**480V**	380V	416V	440V	**480V**
LSA 52.3 S5	kVA	1860	1934	2046	**2232**	1697	1765	1866	**2036**	1953	2031	2149	**2344**	2046	2128	2250	**2455**
	kW	*1488*	*1547*	*1637*	***1786***	*1358*	*1412*	*1493*	***1629***	*1562*	*1625*	*1719*	***1875***	*1637*	*1702*	*1800*	***1964***
LSA 52.3 S6	kVA	2000	2080	2200	**2400**	1824	1897	2007	**2189**	2100	2184	2310	**2520**	2200	2288	2420	**2640**
	kW	*1600*	*1664*	*1760*	***1920***	*1459*	*1518*	*1606*	***1751***	*1680*	*1747*	*1848*	***2016***	*1760*	*1830*	*1936*	***2112***
LSA 52.3 S7	kVA	2200	2288	2420	**2640**	2007	2087	2207	**2408**	2310	2402	2541	**2772**	2420	2517	2662	**2904**
	kW	*1760*	*1830*	*1936*	***2112***	*1606*	*1670*	*1766*	***1926***	*1848*	*1922*	*2033*	***2218***	*1936*	*2014*	*2130*	***2323***
LSA 52.3 L9	kVA	2360	2454	2596	**2832**	2153	2239	2368	**2583**	2478	2577	2726	**2974**	2596	2700	2855	**3115**
	kW	*1888*	*1963*	*2077*	***2266***	*1722*	*1791*	*1894*	***2066***	*1982*	*2062*	*2181*	***2379***	*2077*	*2160*	*2284*	***2492***
LSA 52.3 L12	kVA	2708	2817	2979	**3250**	2470	2569	2717	**2964**	2844	2958	3129	**3413**	2979	3098	3277	**3575**
	kW	*2166*	*2254*	*2383*	***2600***	*1976*	*2055*	*2174*	***2371***	*2275*	*2366*	*2503*	***2730***	*2383*	*2478*	*2622*	***2860***
LSA 52.3 UL16	kVA	2833	2947	3117	**3400**	2584	2688	2843	**3101**	2975	3094	3273	**3570**	3117	3241	3428	**3740**
	kW	2266	*2358*	*2494*	***2720***	*2067*	*2150*	*2274*	***2481***	*2380*	*2475*	*2618*	***2856***	*2494*	*2593*	*2742*	***2992***

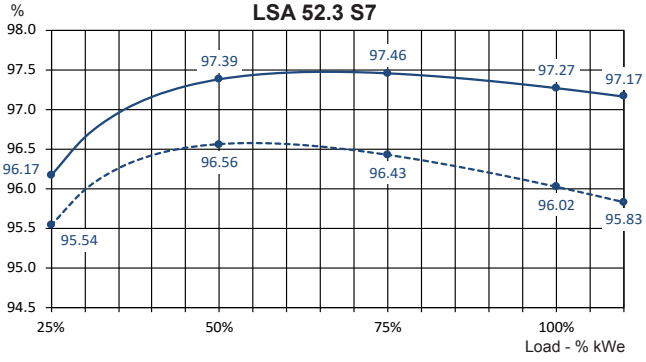
Efficiencies 400V - 50 Hz (— P.F.: 1) (····· P.F.: 0.8)

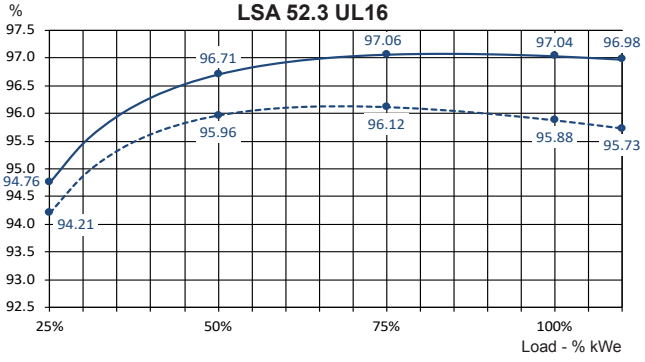








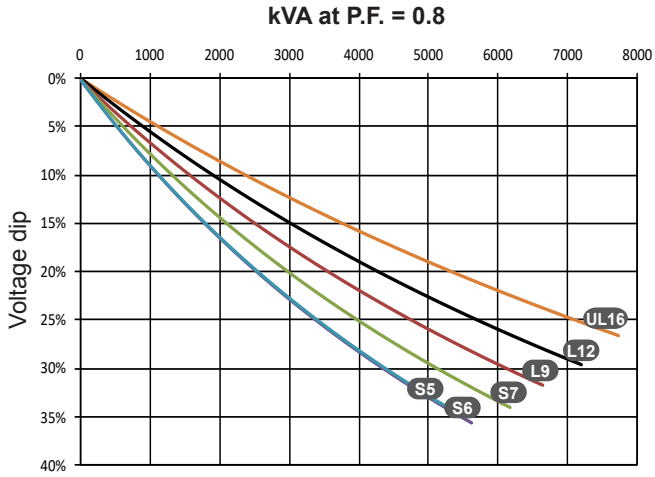


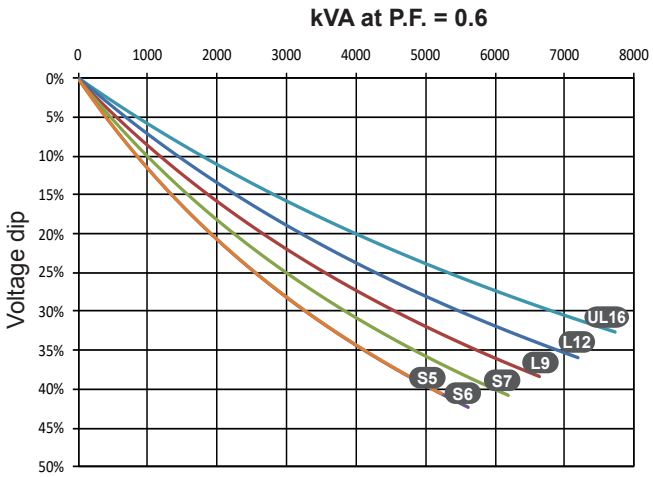


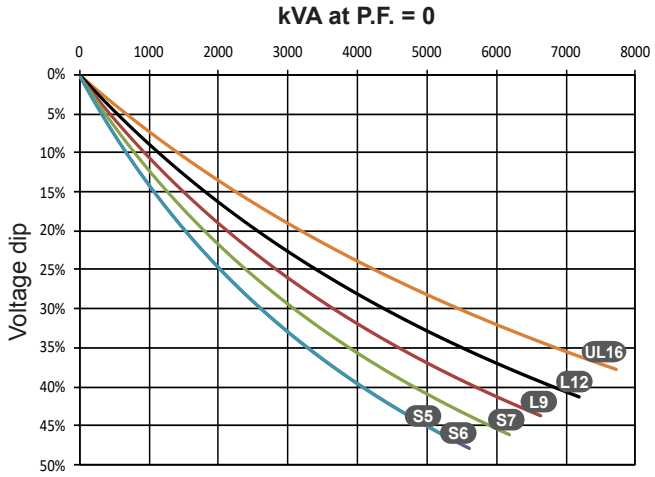
Reactances (%). Time constants (ms) - Class H / 400 V

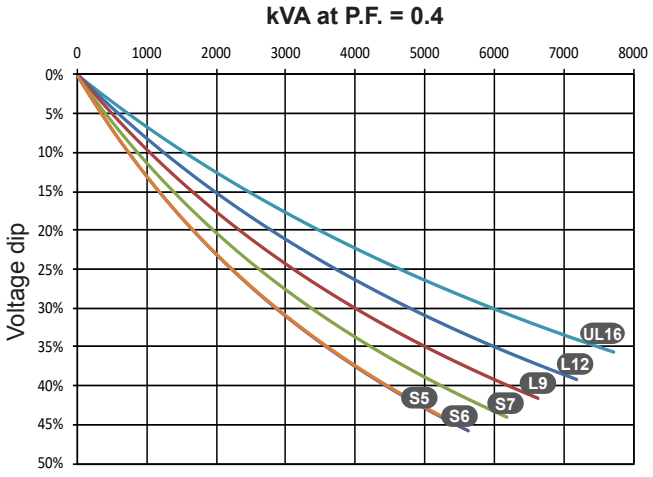
		S5	S6	S7	L9	L12	UL16
Kcc	Short-circuit ratio	0.35	0.32	0.35	0.39	0.42	0.51
Xd	Direct-axis synchronous reactance unsaturated	367	380	376	344	313	267
Xq	Quadrature-axis synchronous reactance unsaturated	187	194	192	175	160	136
T'do	No-load transient time constant	2760	2760	2870	2990	2760	2920
X'd	Direct-axis 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

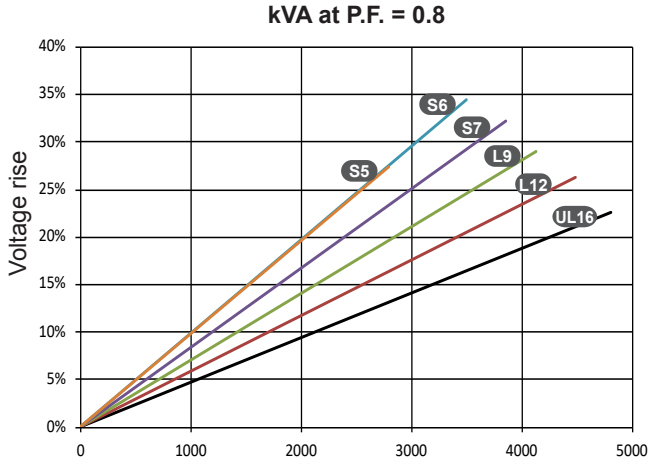




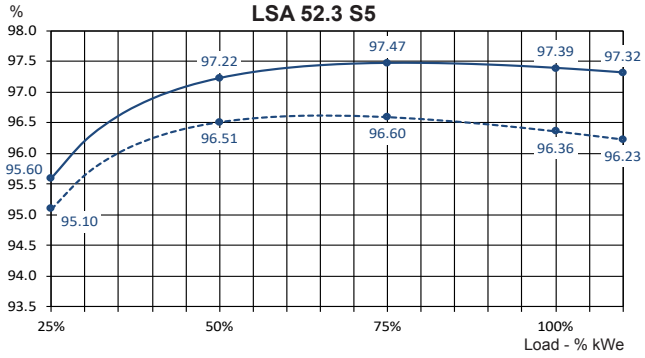


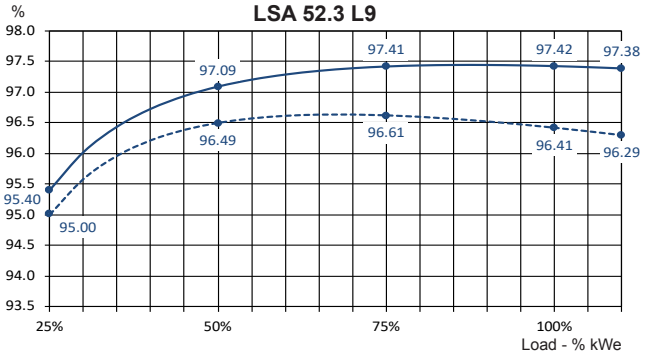


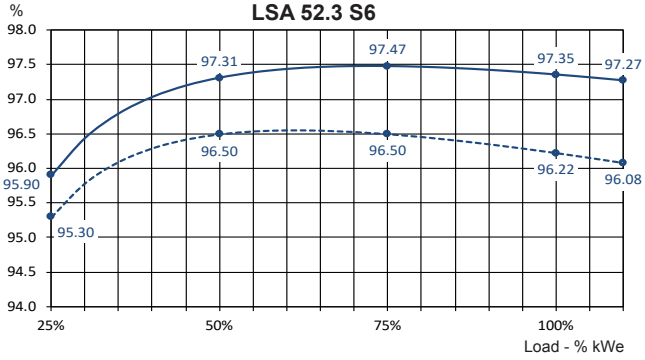
Transient voltage variation at load rejection: 400V - 50 Hz

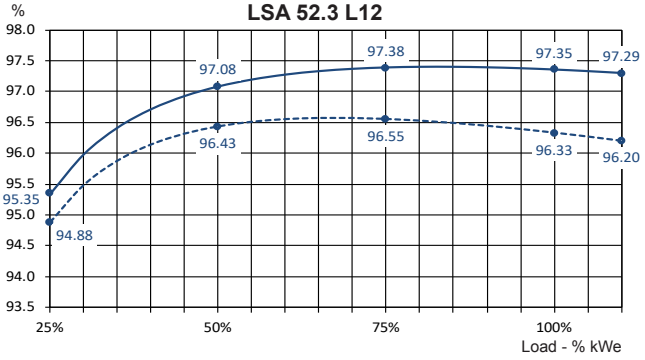


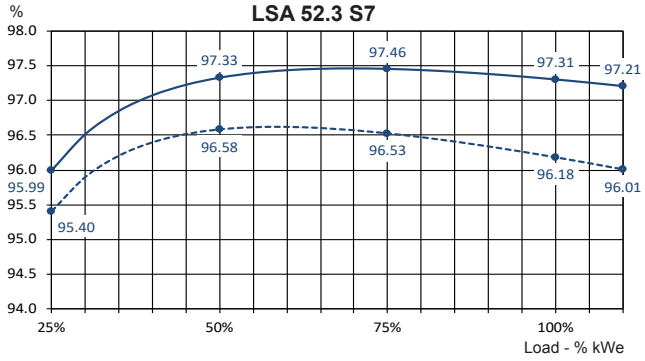
Efficiencies 480V - 60 Hz (— P.F.: 1) (····· P.F.: 0.8)

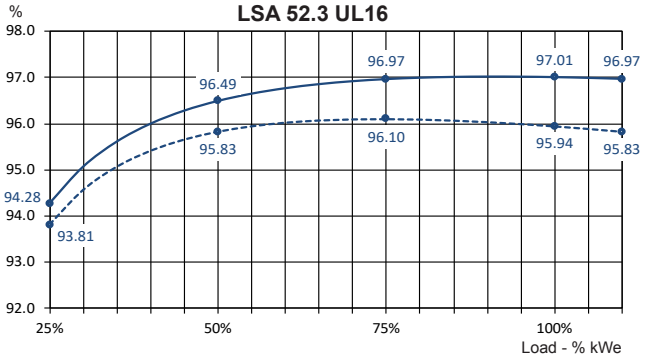








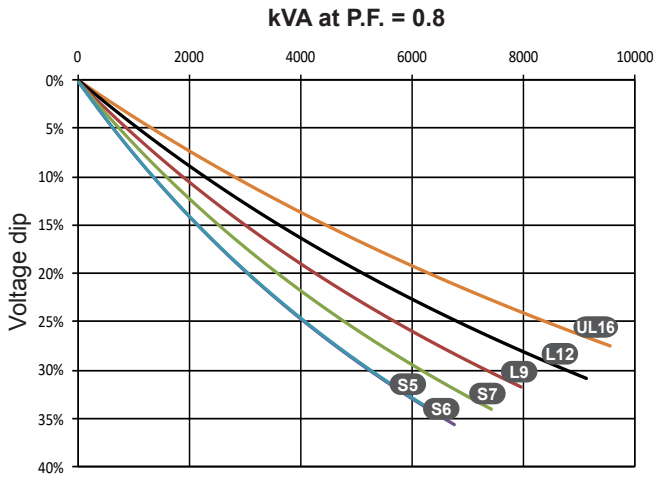


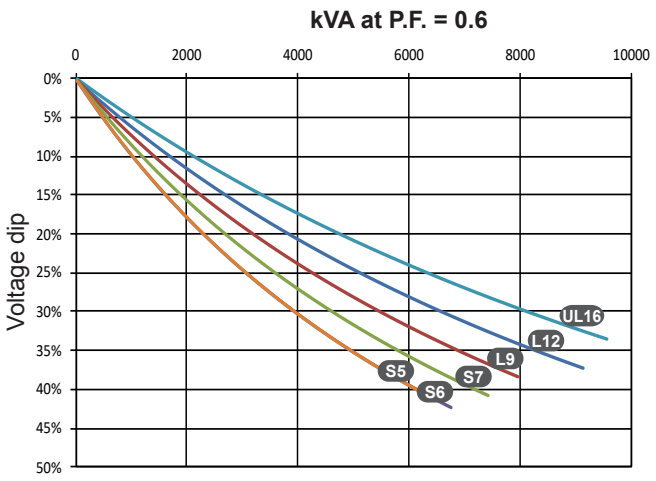


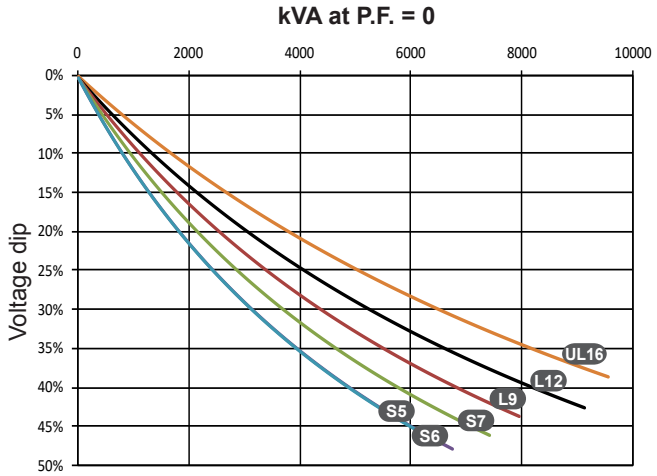
Reactances (%). Time constants (ms) - Class H / 480 V

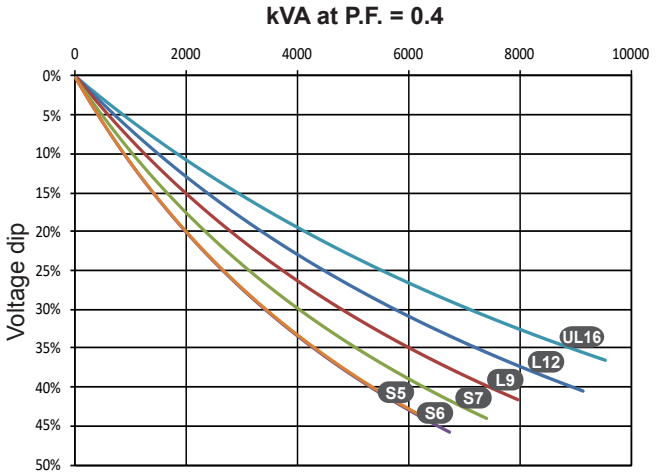
		S5	S6	S7	L9	L12	UL16
Kcc	Short-circuit ratio	0.35	0.32	0.35	0.39	0.40	0.49
Xd	Direct-axis synchronous reactance unsaturated	367	380	376	344	331	275
Xq	Quadrature-axis synchronous reactance unsaturated	187	194	192	175	169	140
T'do	No-load transient time constant	2760	2760	2870	2990	2760	2920
X'd	Direct-axis 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

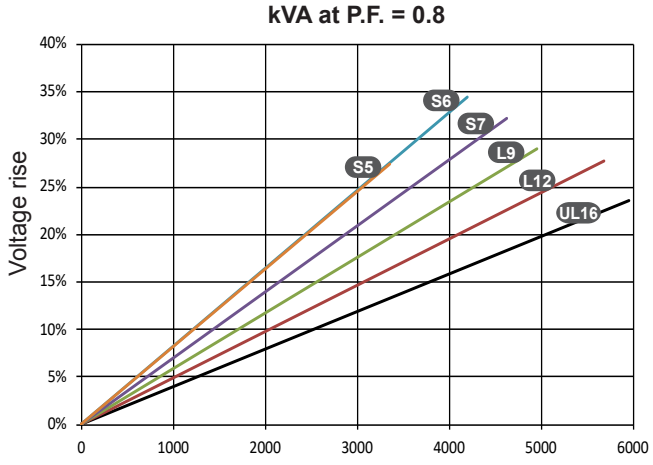






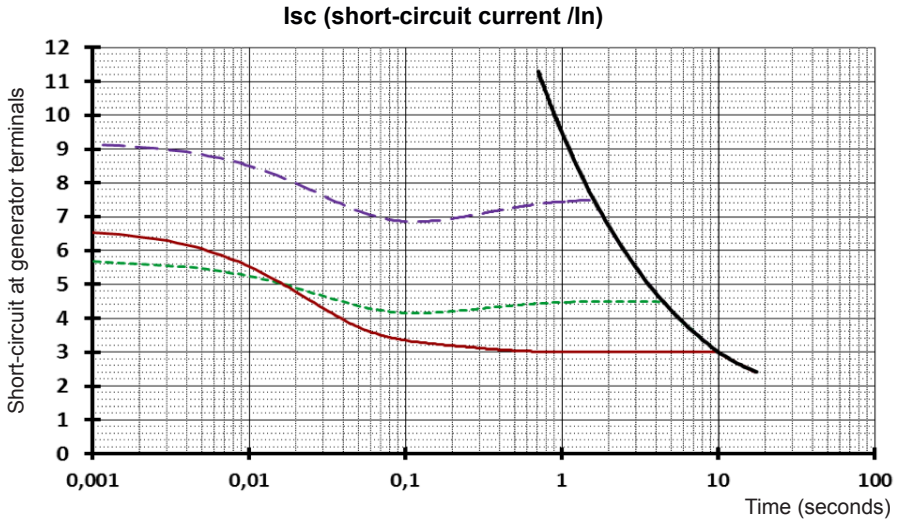


Transient voltage variation at load rejection: 480V - 60 Hz

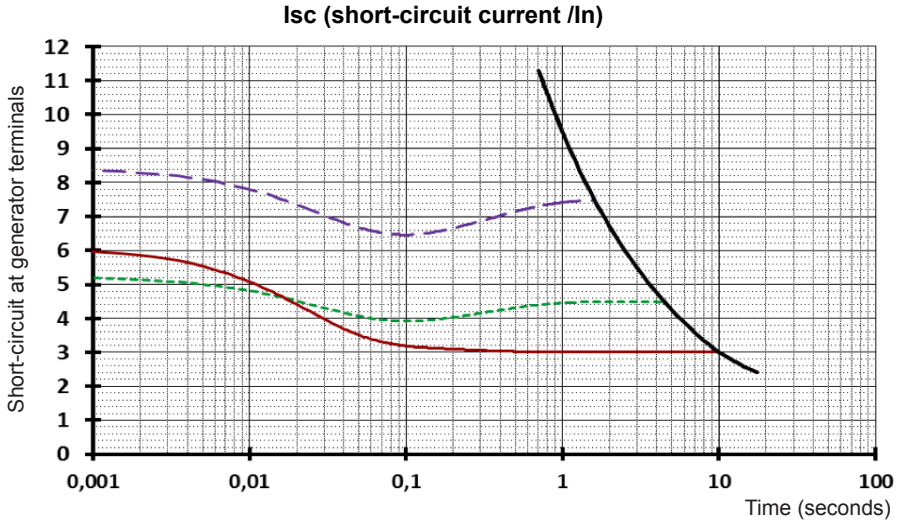


Short-circuit curves at rated speed (star connection Y)

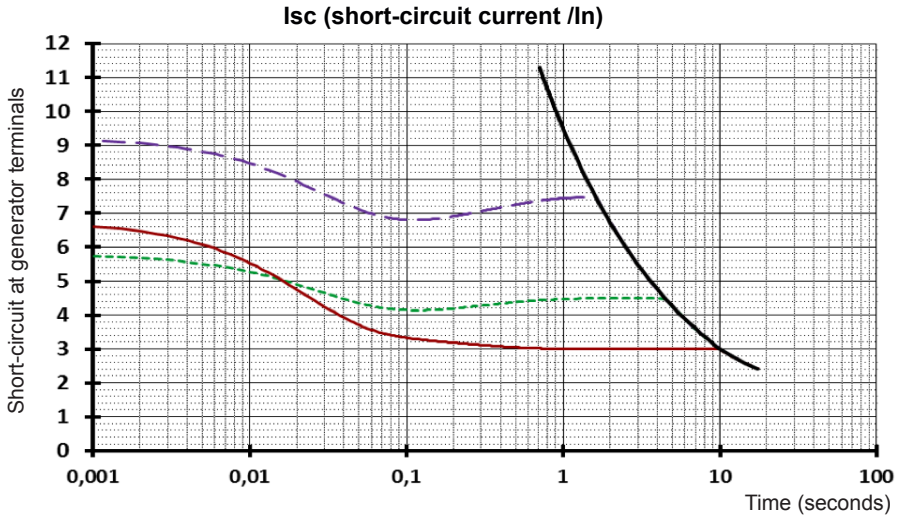
LSA 52.3 S5



LSA 52.3 S6



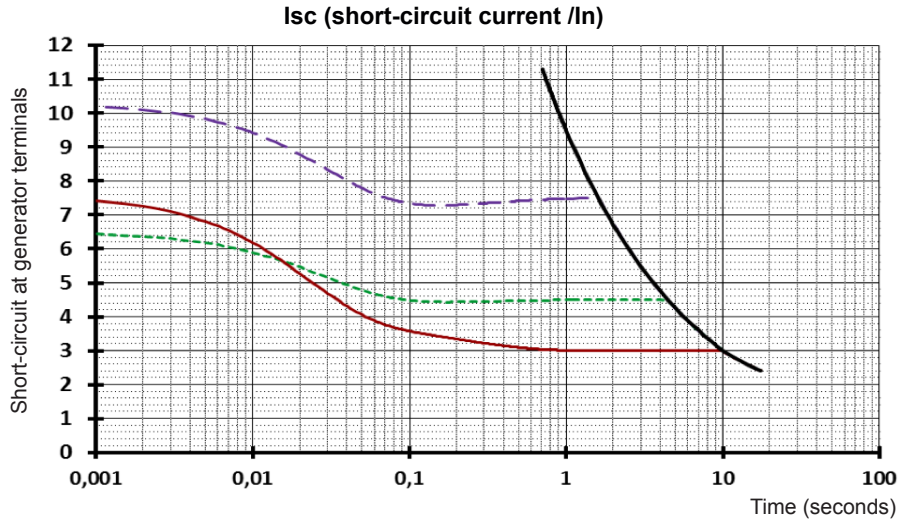
LSA 52.3 S7



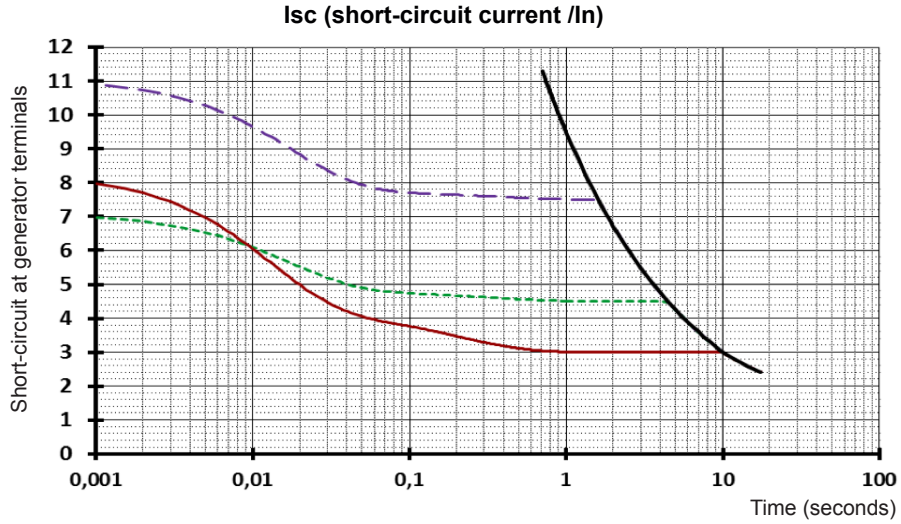
- Symetrical phase to neutral short-circuit
- Symetrical two-phase short-circuit
- Symetrical three-phase short-circuit
- Thermal limit curve

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

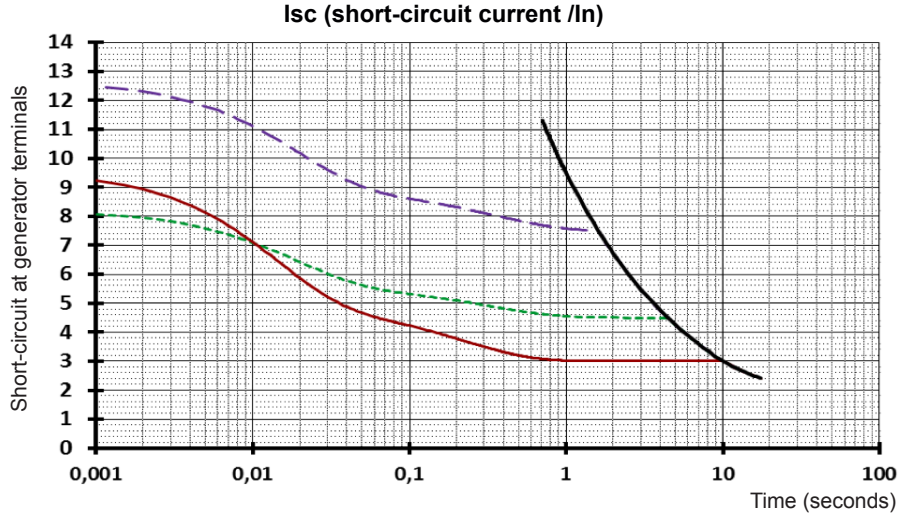
LSA 52.3 L9



LSA 52.3 L12

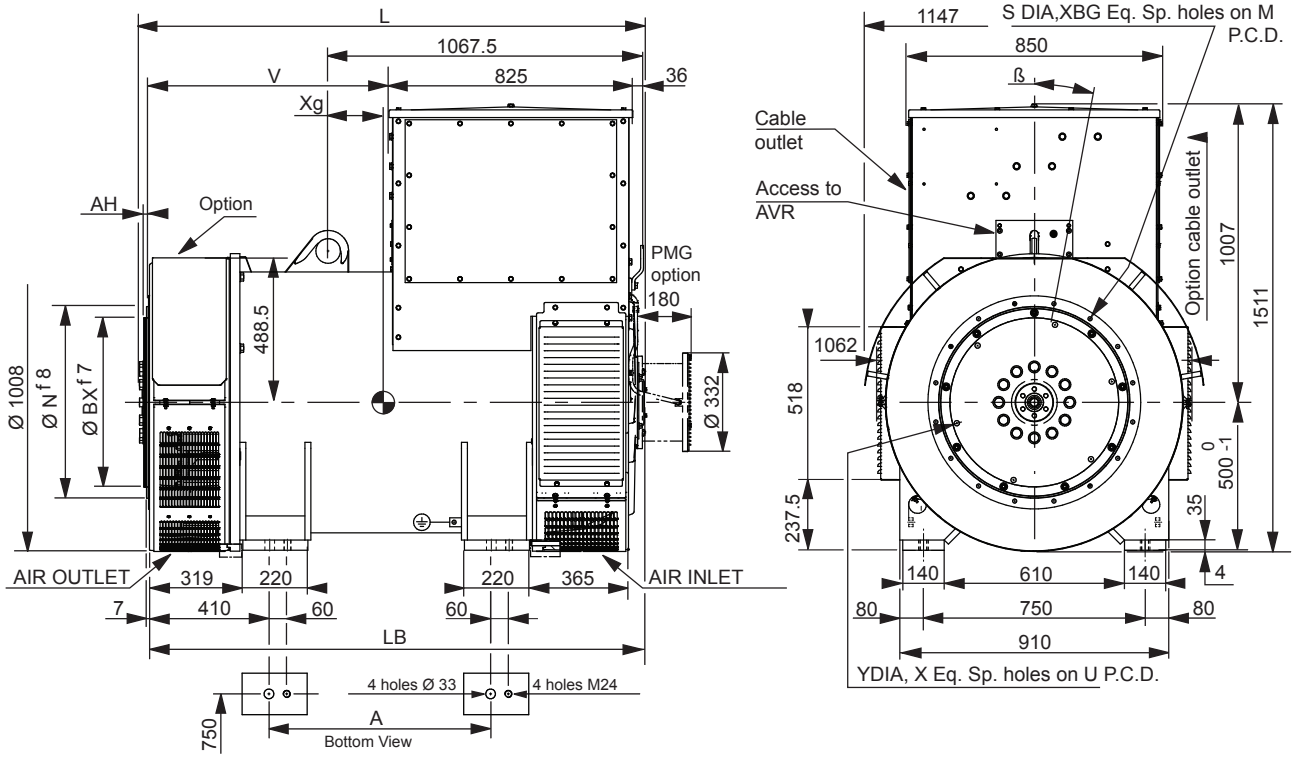


LSA 52.3 UL16



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

Single bearing dimensions



Dimensions (mm) and weight						
Type	L without PMG maxi*	LB	A	V	Xg	Weight** (kg)
LSA 52.3 S5	1713	1683	750	814	187	3705
LSA 52.3 S6	1713	1683	750	814	187	3705
LSA 52.3 S7	1713	1683	750	814	207	3950
LSA 52.3 L9	1913	1883	950	1014	78	4433
LSA 52.3 L12	1913	1883	950	1014	112	4924

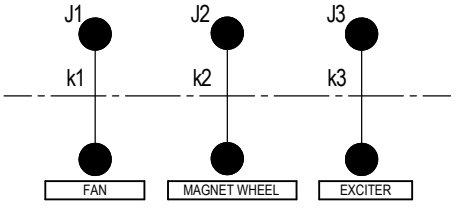
LSA 52.3 UL16 (consult us)
* L maxi = LB + AH maxi + 14 ** Values for S.A.E. 00/21

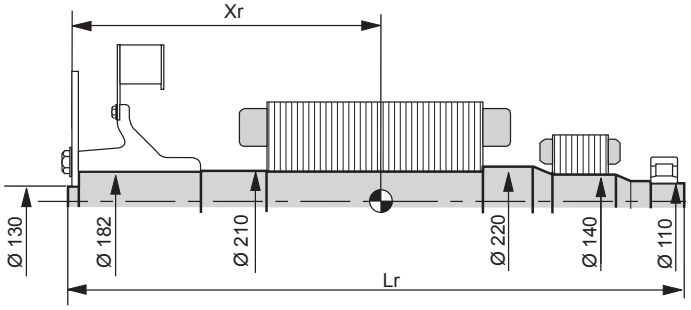
Coupling		
Flange S.A.E.	**0**	**00**
Flex plate S.A.E. **21**		X
Flex plate S.A.E. **18**	X	X

Flange (mm)					
S.A.E.	N	M	XBG	S	β°
0	647.7	679.5	16	14	11°15'
00	787.4	850.9	16	14	11° 15'

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



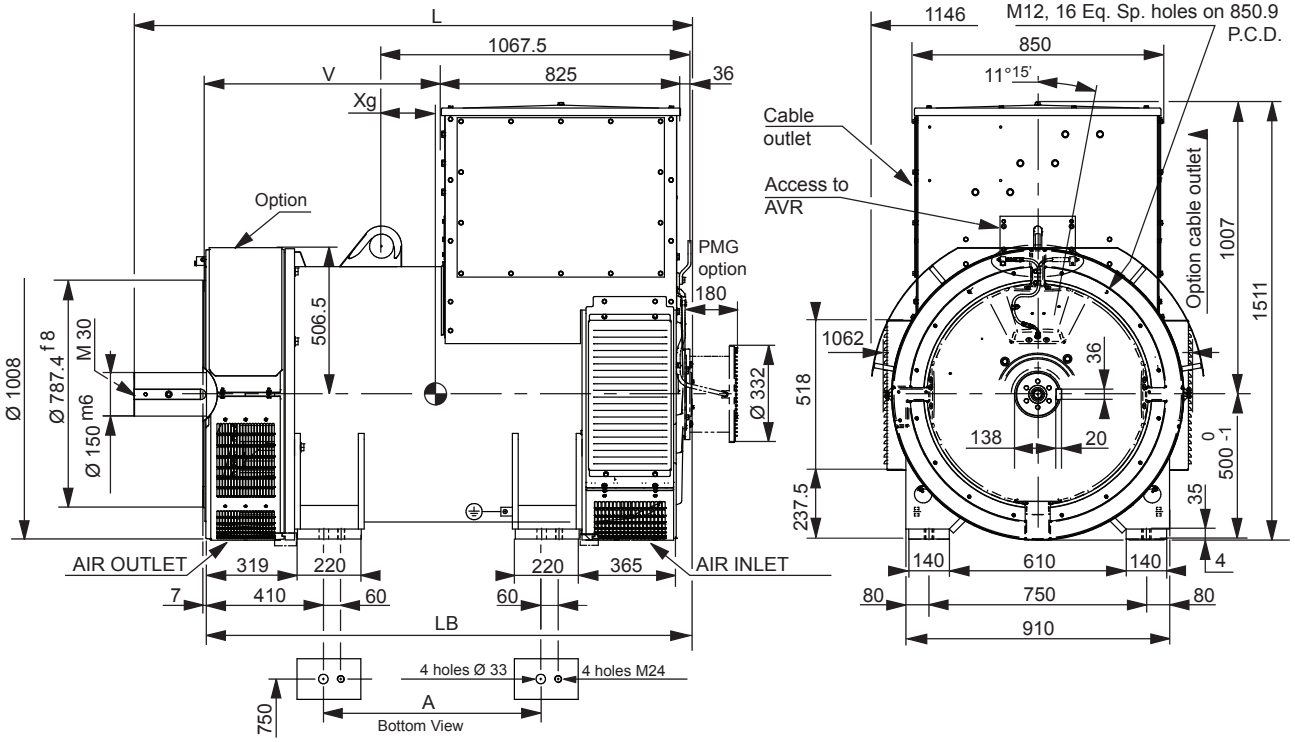


Centre of gravity: Xr (mm), Rotor length: Lr (mm), Weight: M (kg), Moment of inertia: J (kgm²) : (4J = MD²)									Torsional rigidity					
Flex plate	S.A.E. 18				S.A.E. 21				[Nm/rad]			(kg.m²)		
Type	Xr	Lr	M	J	Xr	Lr	M	J	k1	k2	k3	J1	J2	J3
LSA 52.3 S5	720.4	1689	1420	43.4	702.8	1689	1424	44.3	5.00 10E7	2.50 10E7	1.54 10E7	10.3	32.4	1.5
LSA 52.3 S6	720.4	1689	1420	43.4	702.8	1689	1424	44.3	5.00 10E7	2.50 10E7	1.54 10E7	10.3	32.4	1.5
LSA 52.3 S7	741.5	1689	1453	45	723.9	1689	1457	45.9	5.00 10E7	2.41 10E7	1.59 10E7	10.3	34.1	1.5
LSA 52.3 L9	811.3	1889	1635	50	793.7	1889	1639	50.9	5.00 10E7	2.29 10E7	1.42 10E7	10.3	39	1.6
LSA 52.3 L12	858.4	1889	1808	56.5	840.9	1889	1812	57.4	5.00 10E7	2.14 10E7	1.52 10E7	10.3	45.6	1.4

LSA 52.3 UL16 (consult us)

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.

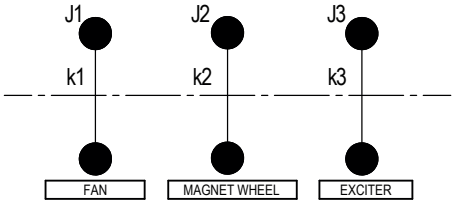
Two bearing dimensions

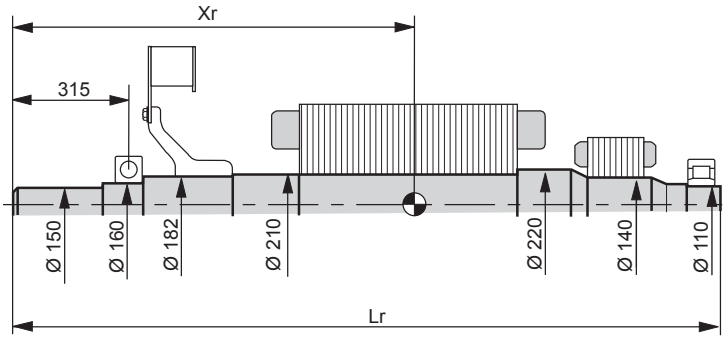


Dimensions (mm) and weight						
Type	L without PMG	LB	A	V	Xg	Weight (kg)
LSA 52.3 S5	1933	1683	750	814	192	3748
LSA 52.3 S6	1933	1683	750	814	192	3748
LSA 52.3 S7	1933	1683	750	814	212	3991
LSA 52.3 L9	2133	1883	950	1014	83	4476
LSA 52.3 L12	2133	1883	950	1014	117	4967

LSA 52.3 UL16 (consult us)

Torsional analysis data





Centre of gravity: Xr (mm), Rotor length: Lr (mm), Weight: M (kg), Moment of inertia: J (kgm²) : (4J = MD²)					Torsional rigidity					
					[Nm/rad]			(kg.m²)		
Type	Xr	Lr	M	J	k1	k2	k3	J1	J2	J3
LSA 52.3 S5	973.4	1912	1363	41.7	1.82 10E7	3.05 10E7	1.54 10E7	7.7	32.4	1.5
LSA 52.3 S6	973.4	1912	1363	41.7	1.82 10E7	3.05 10E7	1.54 10E7	7.7	32.4	1.5
LSA 52.3 S7	994.5	1912	1396	43.3	1.82 10E7	2.91 10E7	1.59 10E7	7.7	34.1	1.5
LSA 52.3 L9	1064.3	2112	1578	48.3	1.82 10E7	2.74 10E7	1.42 10E7	7.7	39	1.6
LSA 52.3 L12	1110.6	2112	1752	54.8	1.82 10E7	2.53 10E7	1.52 10E7	7.7	45.6	1.4

LSA 52.3 UL16 (consult us)

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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