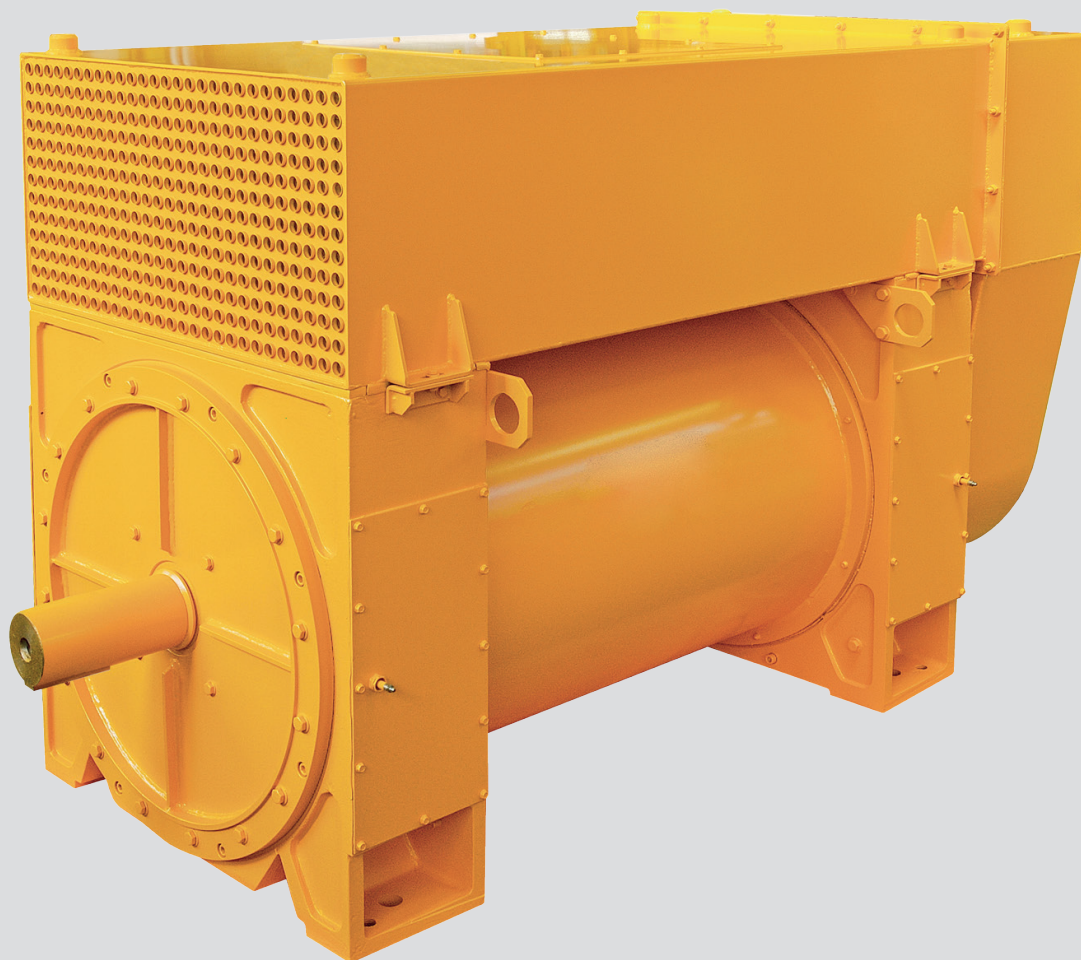




LSA 49.1 IC 06 / LSA 49.1 IC 08

Low Voltage Alternators - 4 pole

350 to 530 kVA - 50 Hz / 420 to 635 kVA - 60 Hz

Electrical and mechanical data

LEROY-SOMER™

Nidec
All for dreams

The best of performance

The LSA 49.1 IC 06 / LSA 49.1 IC 08 Nidec Leroy-Somer are totally enclosed air or water-cooled alternators for special applications.

LSA 49.1 IC 06 cooling is performed by an **air/air exchanger** (cooling index: IC 6.A1.A1 in accordance with standard IEC 60034-6).

LSA 49.1 IC 08 cooling is performed by an **air/water exchanger** (cooling index: IC 8.A1.W7 in accordance with standard IEC 60034-6).

As an option, they can be ATEX (Explosive Atmosphere) certified in accordance with EEXem II T3 protection.

Standards

Nidec Leroy-Somer LSA 49.1 IC 06 / LSA 49.1 IC 08 alternators meet 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 49.1 IC 06 / LSA 49.1 IC 08 alternators can be integrated in EC marked generator sets, and they bear EC, EAC and CMIM markings. They are 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 (3 wires + neutral), standard 6-wire (6S)
- Voltage range:
 - 50 Hz : 380V - 400V - 415V
 - 60 Hz : 440V - 480V
 - Other voltages: consult us
- High efficiency and motor starting capacity

Excitation and regulation system

Excitation system		Regulation options		
AVR	AREP	C.T. Current transformer for paralleling	Mains paralleling	Remote voltage potentiometer
R450	Standard	√	√	√
D550	Option	√	√	√

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

Protection system and options

- The LSA 49.1 IC 06 / LSA 49.1 IC 08 are enclosed alternators IP 55
- Space heater and stator thermal protection (PT100)
- Steel frame of LSA 49.1 IC 06 / LSA 49.1 IC 08 exchangers
- Depending on environments, several protection systems are available:
 - *For the range LSA 49.1 IC 06 (Air-cooled) in standard:*
 - Exchanger with steel or aluminium tube
 - Options:
 - Exchanger with stainless steel tube
 - Exchanger with stainless steel tube and stainless steel end plates
 - A complete stainless steel exchanger
 - *For the range LSA 49.1 IC 08 (Hydro-refrigerated):*
 - Land application / freshwater, non-saline atmosphere:
 - Exchanger with single tube Cu (SF Cu F25)
 - Marine application / seawater, saline atmosphere:
 - Exchanger with double tube: Cu (SF Cu F25) outside tube and Cupronickel for inside tube

Mechanical construction

- Compact and rigid assembly to better withstand generator vibrations
- Steel frame
- Steel endshields and cast iron spacers for air intake and outlet
- Two-bearing configuration
- Half-key balancing
- Regreasable bearings
- Standard direction of rotation: clockwise when looking at the drive end view

Terminal box design

- AVR and accessories to be mounted outside the terminal box by the installer
- 1 terminal box on the left-hand side as seen from the shaft end and cables exiting downwards as standard
- Separation between the power and auxiliary circuits (space heaters + thermal protection)

“ATEX” certification for explosive atmospheres

LSA 49.1 IC 06 alternators are also available in an ATEX version for zone 2 in accordance with  II 3G marking in EEx em II T3 protection mode. The alternators need to be certified by an external body, consult us for this certification.

General characteristics

Insulation class	H	Excitation system	AREP
Winding pitch	2/3 (wind. 6S)	AVR type	R450
Number of wires	6	Voltage regulation (*)	± 0.5 %
Protection	IP 55	Short-circuit current	300% (3 IN): 10s
Altitude	≤ 1000 m	Total Harmonic Distortion THD (**)	no-load < 4 % - on load < 4 %
Overspeed	2250 R.P.M.	Waveform: NEMA = TIF (**)	< 50
		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												
IC 06						IC 08						
Continuous						Continuous						
Duty / T° C	H / 125° K					F / 105° K						
Class / T° K	3 ph.					3 ph.						
Phase	3 ph.					3 ph.						
Y	380V	400V	415V	380V	400V	415V	380V	400V	415V	380V	400V	415V
LSA 49.1 L2 kVA	350	350	350	315	315	315	405	405	405	365	365	365
kW	280	280	280	252	252	252	324	324	324	292	292	292
LSA 49.1 L6 kVA	435	435	435	390	390	390	505	505	505	455	455	455
kW	348	348	348	312	312	312	404	404	404	364	364	364
LSA 49.1 L9 kVA	530	530	530	475	475	475	615	615	615	555	555	555
kW	424	424	424	380	380	380	492	492	492	444	444	444

Ratings 60 Hz - 1800 R.P.M.

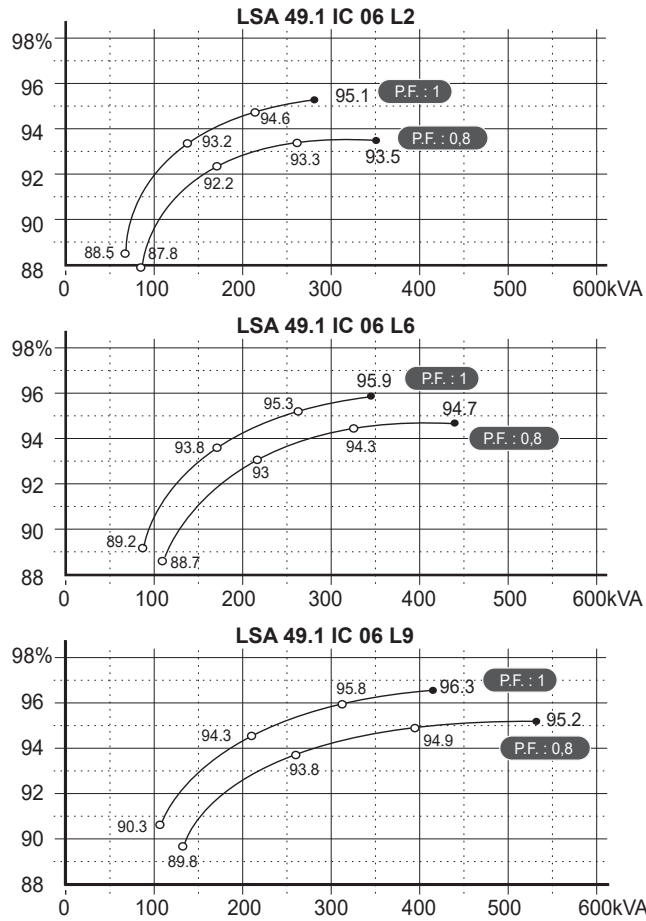
kVA / kW - P.F. = 0.8									
IC 06					IC 08				
Continuous					Continuous				
Duty / T° C	H / 125° K				F / 105° K				
Class / T° K	3 ph.				3 ph.				
Phase	3 ph.				3 ph.				
Y	440V	480V	440V	480V	440V	480V	440V	480V	
LSA 49.1 L2 kVA	400	420	360	380	465	500	420	450	
kW	320	336	288	304	372	400	336	360	
LSA 49.1 L6 kVA	480	525	430	470	560	610	505	550	
kW	384	417	344	376	448	488	404	440	
LSA 49.1 L9 kVA	605	635	545	570	705	740	635	665	
kW	484	507	436	456	564	592	508	532	

The power ratings are given for the following conditions:

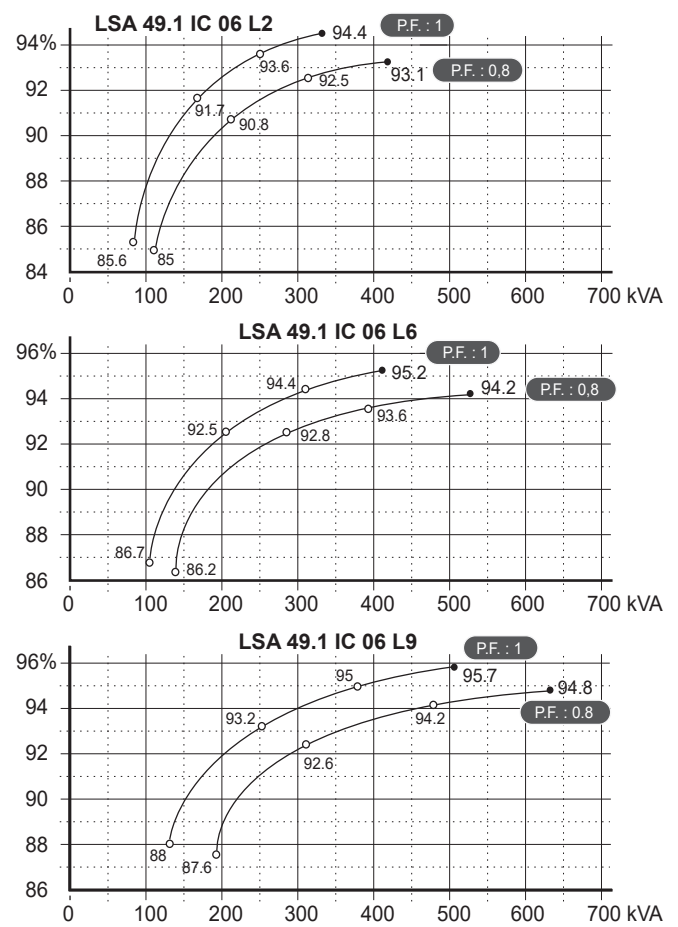
LSA 49.1 IC 06: ambient temperature: 40°C to 50°C

LSA 49.1 IC 08: water temperature: 32°C

Efficiencies 50 Hz - P.F.: 1 / 0.8



Efficiencies 60 Hz - P.F.: 1 / 0.8



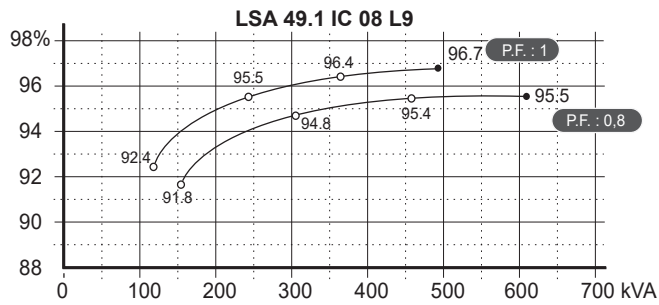
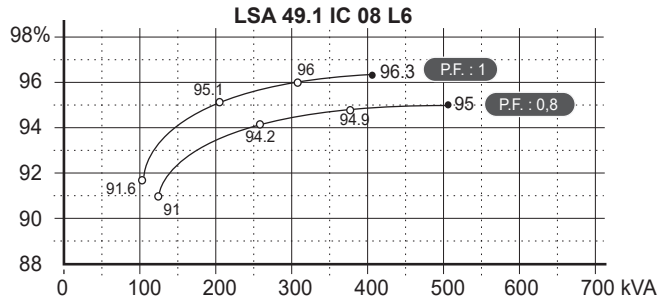
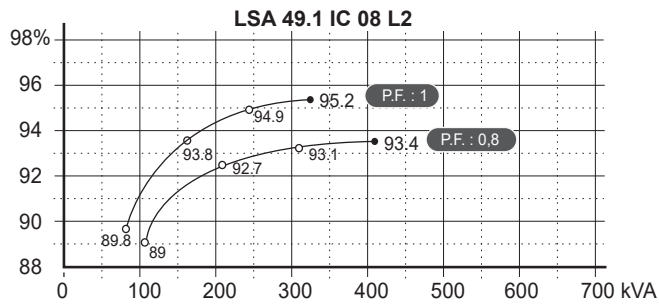
Reactances (%). Time constants (ms) - Class H

		50 Hz - Class H / 400V			60 Hz - Class H / 480V		
		L2	L6	L9	L2	L6	L9
Kcc	Short-circuit ratio	0.59	0.71	0.7	0.59	0.71	0.7
Xd	Direct-axis synchronous reactance unsaturated	219	181	183	219	182	183
Xq	Quadrature-axis synchronous reactance unsaturated	131	108	110	131	109	110
T'do	No-load transient time constant	1878	2047	2111	1878	2047	2111
X'd	Direct-axis transient reactance saturated	11.6	8.8	8.7	11.6	8.8	8.7
T'd	Short-circuit transient time constant	100	100	100	100	100	100
X''d	Direct-axis subtransient reactance saturated	9.3	7	6.9	9.3	7	6.9
T''d	Subtransient time constant	10	10	10	10	10	10
X''q	Quadrature-axis subtransient reactance saturated	11.2	7.8	7.5	11.2	7.9	7.5
Xo	Zero sequence reactance unsaturated	0.5	0.4	0.5	0.5	0.4	0.5
X2	Negative sequence reactance saturated	10.3	7.5	7.3	10.3	7.5	7.3
Ta	Armature time constant	15	15	15	15	15	15

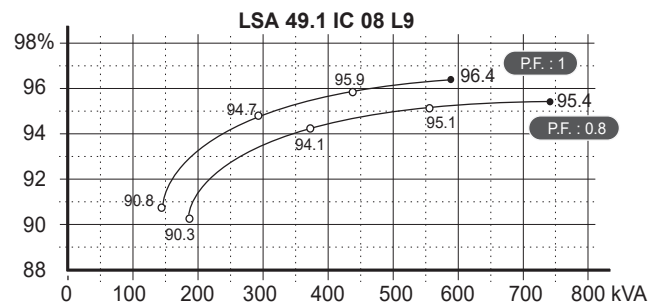
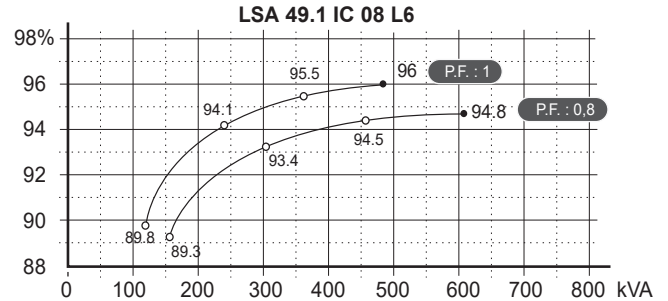
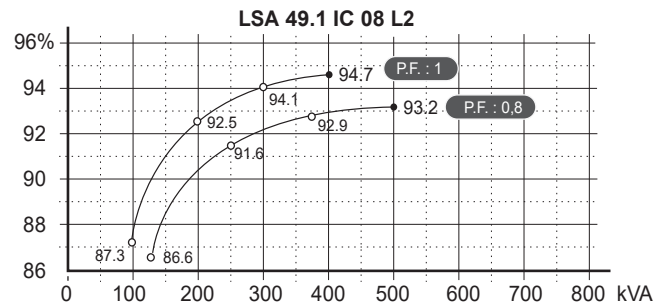
Other characteristics class H

io (A)	No-load excitation current	0.9	0.9	0.9	0.9	0.9	0.9
ic (A)	On-load excitation current	2.5	2.2	2.2	2.5	2.2	2.2
uc (V)	On-load excitation voltage	30	26	26	30	26	26
ms	Response time ($\Delta U = 20\%$ transient)	500	500	500	500	500	500
kVA	Start ($\Delta U = 20\%$ continuous or 50% transient)	1280	1985	2372	1420	2482	2972
%	Transient ΔU (on-load 4/4) - P.F.: 0.8 _{LAG}	10.5	7.4	7.3	10.5	7.4	7.3
W	No-load losses	8980	10425	11360	14300	16280	17620
W	Heat dissipation	19465	19476	21378	24900	25860	27865

Efficiencies 50 Hz - P.F.: 1 / 0.8



Efficiencies 60 Hz - P.F.: 1 / 0.8



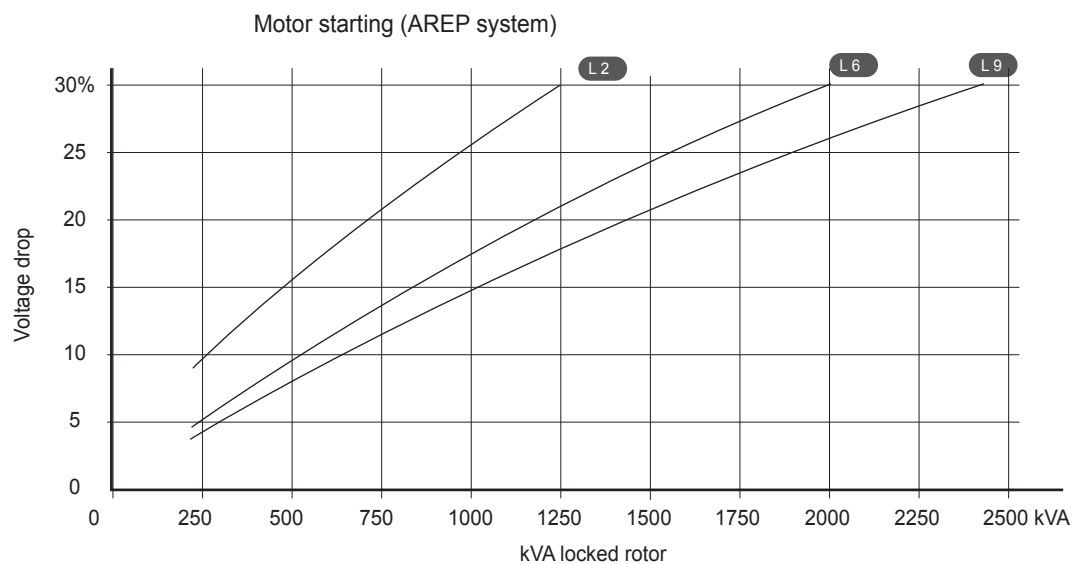
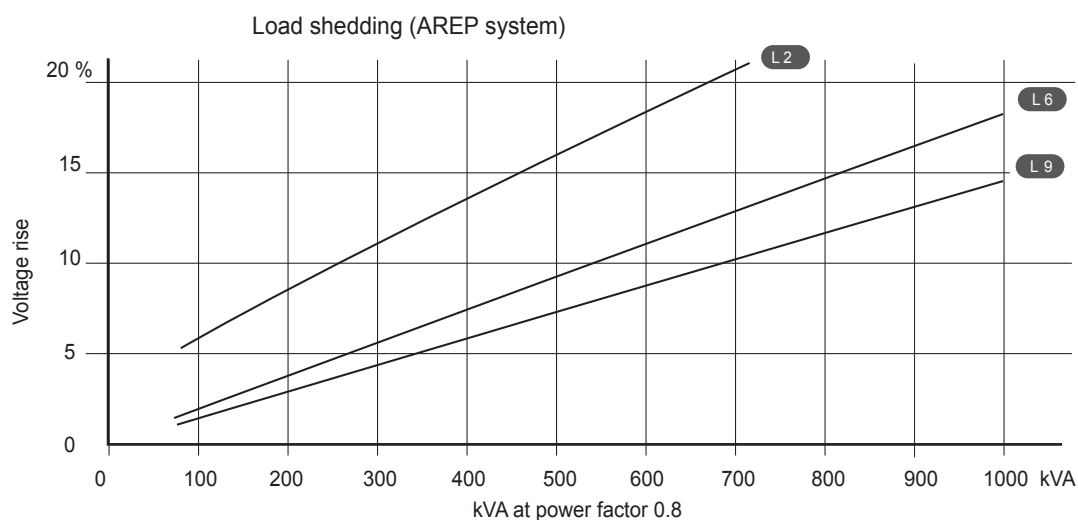
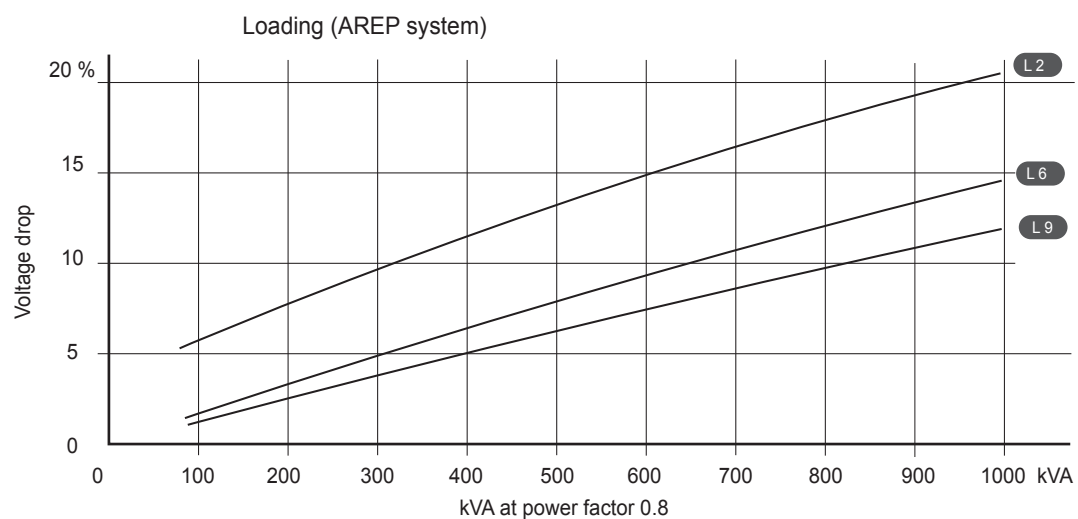
Reactances (%). Time constants (ms) - Class H

		50 Hz - Class H / 400V			60 Hz - Class H / 480V		
		L2	L6	L9	L2	L6	L9
Kcc	Short-circuit ratio	0.51	0.61	0.6	0.49	0.61	0.6
Xd	Direct-axis synchronous reactance unsaturated	253	210	212	260	211	213
Xq	Quadrature-axis synchronous reactance unsaturated	152	125	125	156	127	128
T'do	No-load transient time constant	1878	2047	2111	1878	2047	2111
X'd	Direct-axis transient reactance saturated	13.4	10.2	10.1	13.9	10.2	10.1
T'd	Short-circuit transient time constant	100	100	100	100	100	100
X''d	Direct-axis subtransient reactance saturated	10.7	8.1	8	11	8.1	8
T''d	Subtransient time constant	10	10	10	10	10	10
X''q	Quadrature-axis subtransient reactance saturated	13	9	8.7	13.3	9.2	8.7
Xo	Zero sequence reactance unsaturated	0.6	0.45	0.6	0.6	0.45	0.6
X2	Negative sequence reactance saturated	11.9	8.7	8.5	12.2	8.7	8.5
Ta	Armature time constant	15	15	15	15	15	15

Other characteristics class H

io (A)	No-load excitation current	0.9	0.9	0.9	0.9	0.9	0.9
ic (A)	On-load excitation current	2.8	2.4	2.4	2.8	2.4	2.4
uc (V)	On-load excitation voltage	33	29	29	33	29	29
ms	Response time ($\Delta U = 20\%$ transient)	500	500	500	500	500	500
kVA	Start ($\Delta U = 20\%$ continuous or 50% transient)	1280	1985	2372	1420	2482	2972
%	Transient ΔU (on-load 4/4) - P.F.: 0.8 _{LAG}	11.5	8.1	8	11.8	8.2	8.1
W	No-load losses	7490	9000	9860	11705	13820	15030
W	Heat dissipation	22895	21260	23180	29185	26765	28545

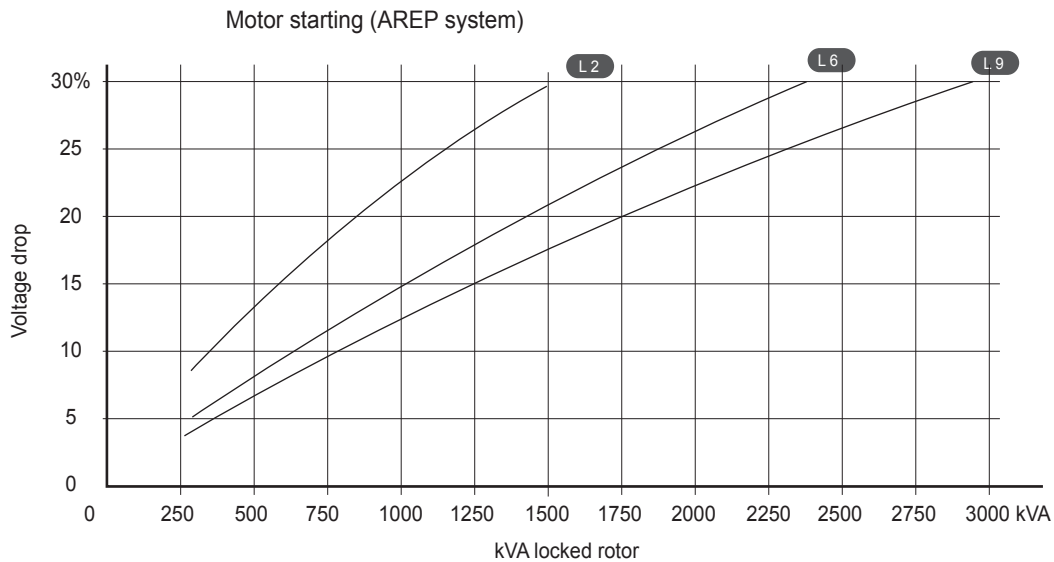
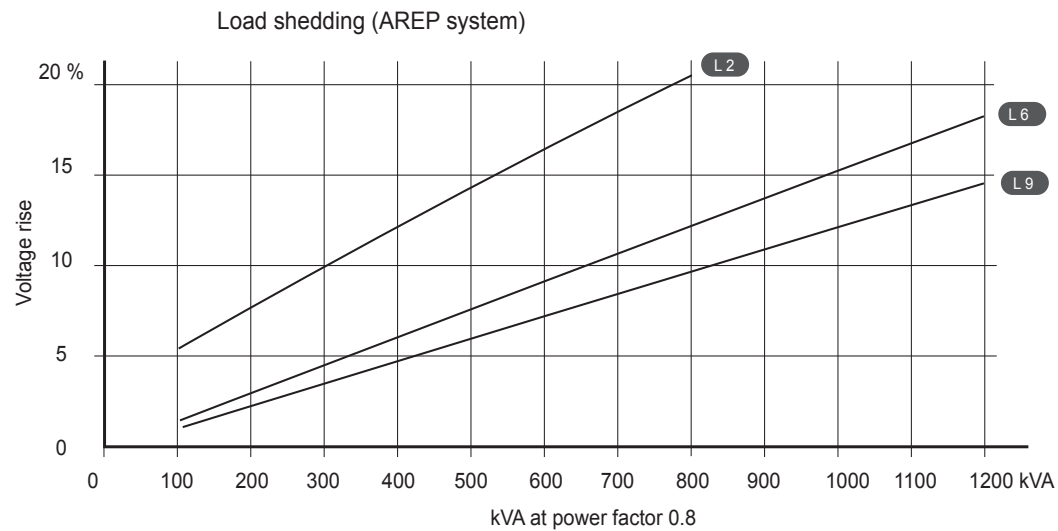
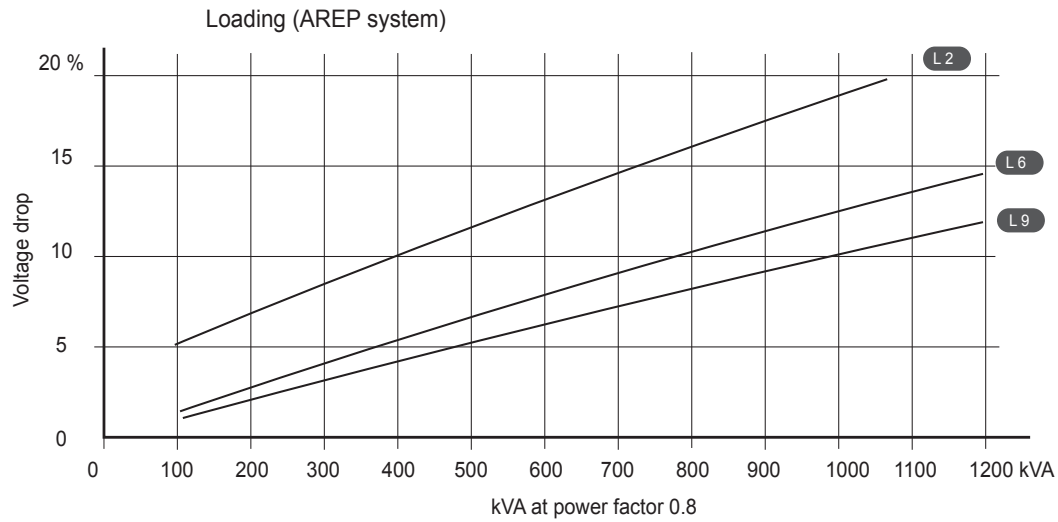
Transient voltage variation 400V - 50 Hz



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 $(230/U)^2$.

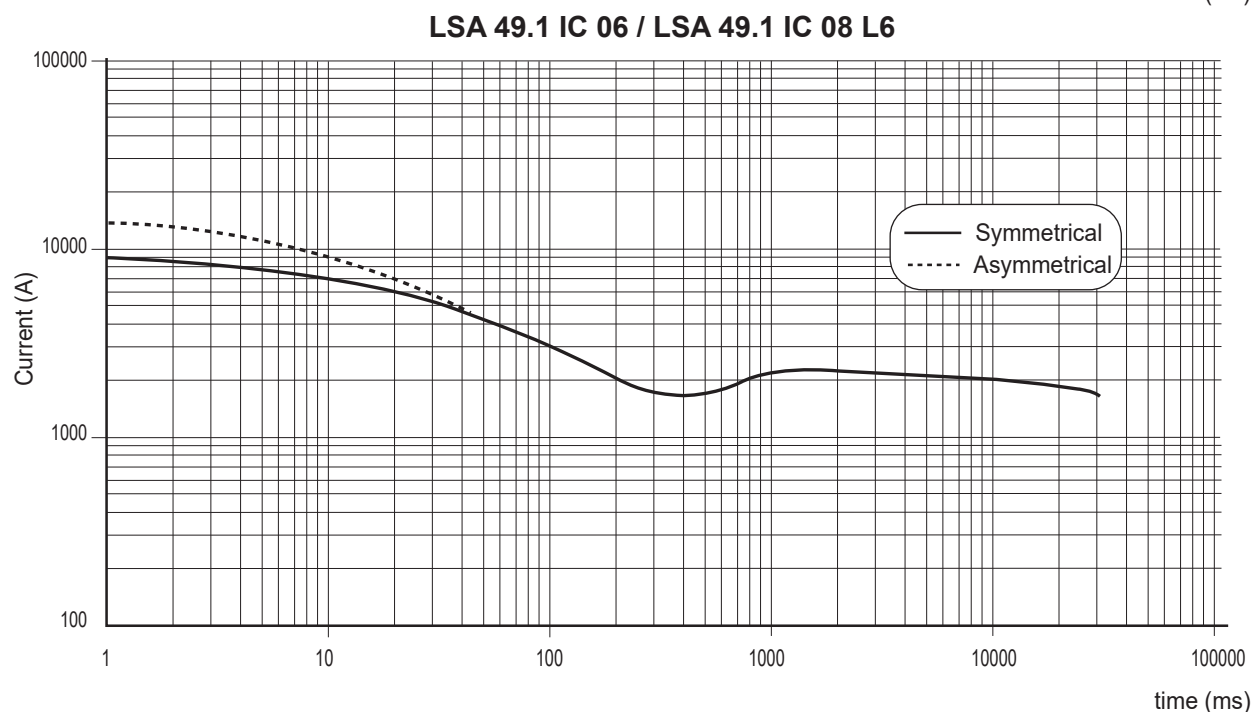
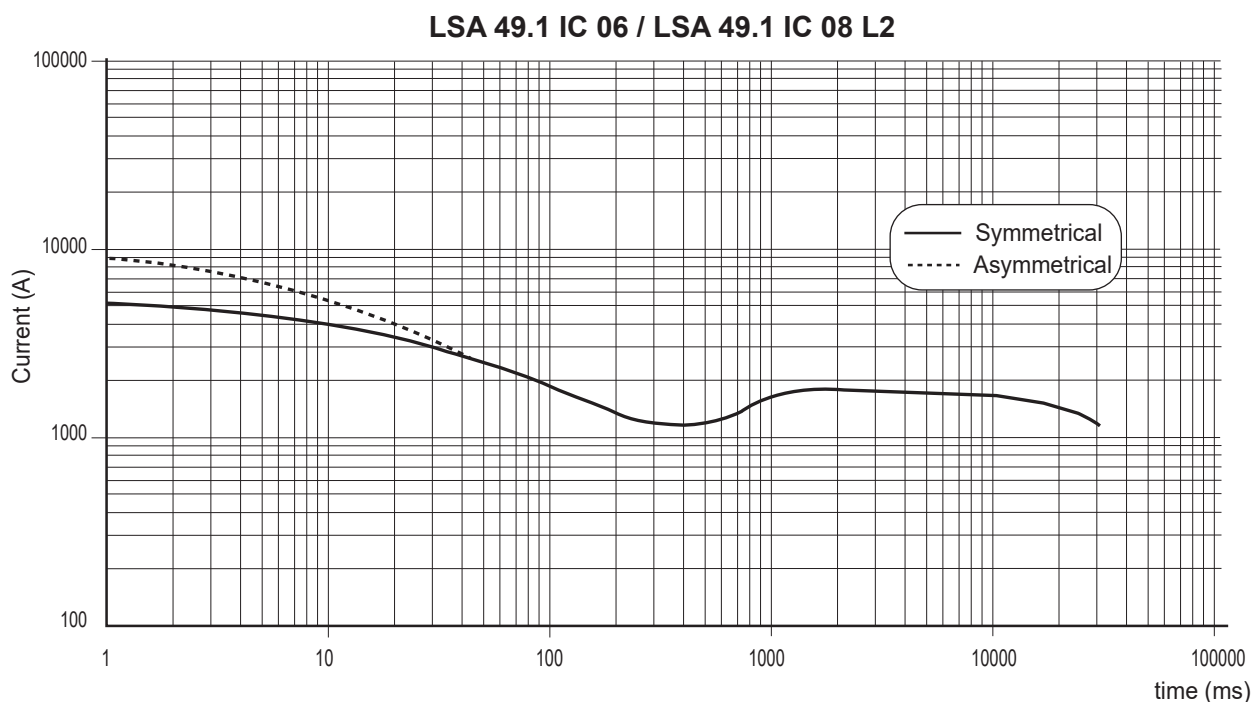
Transient voltage variation 480V - 60 Hz



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

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)



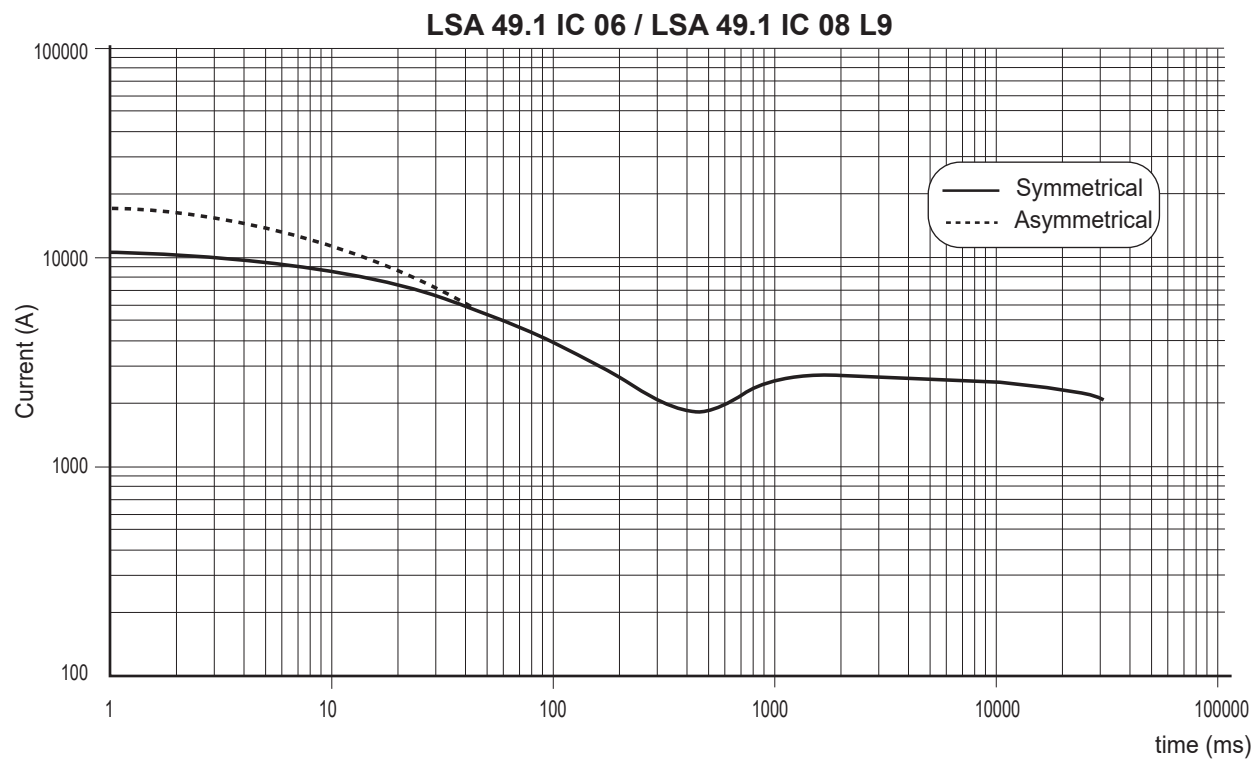
Influence due to connection

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)

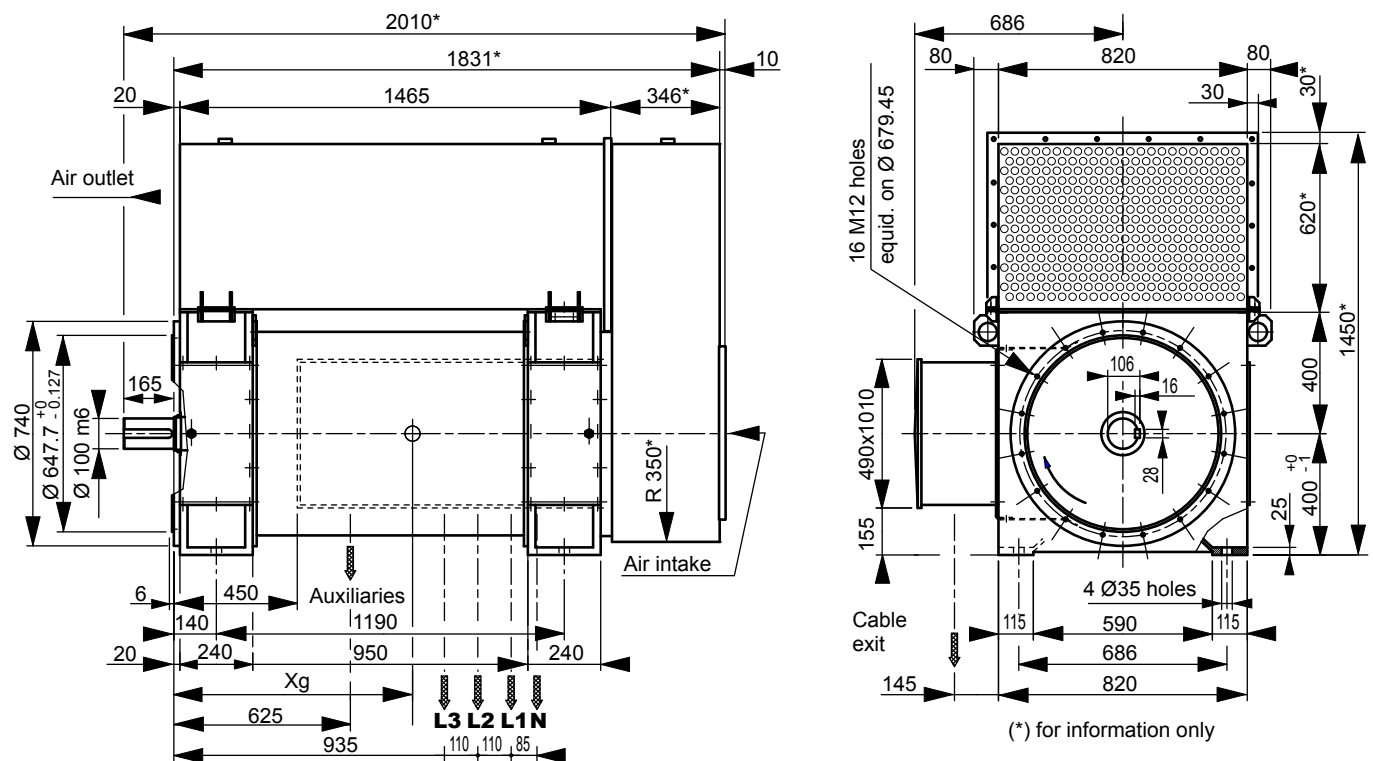


Influence due to short-circuit

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.

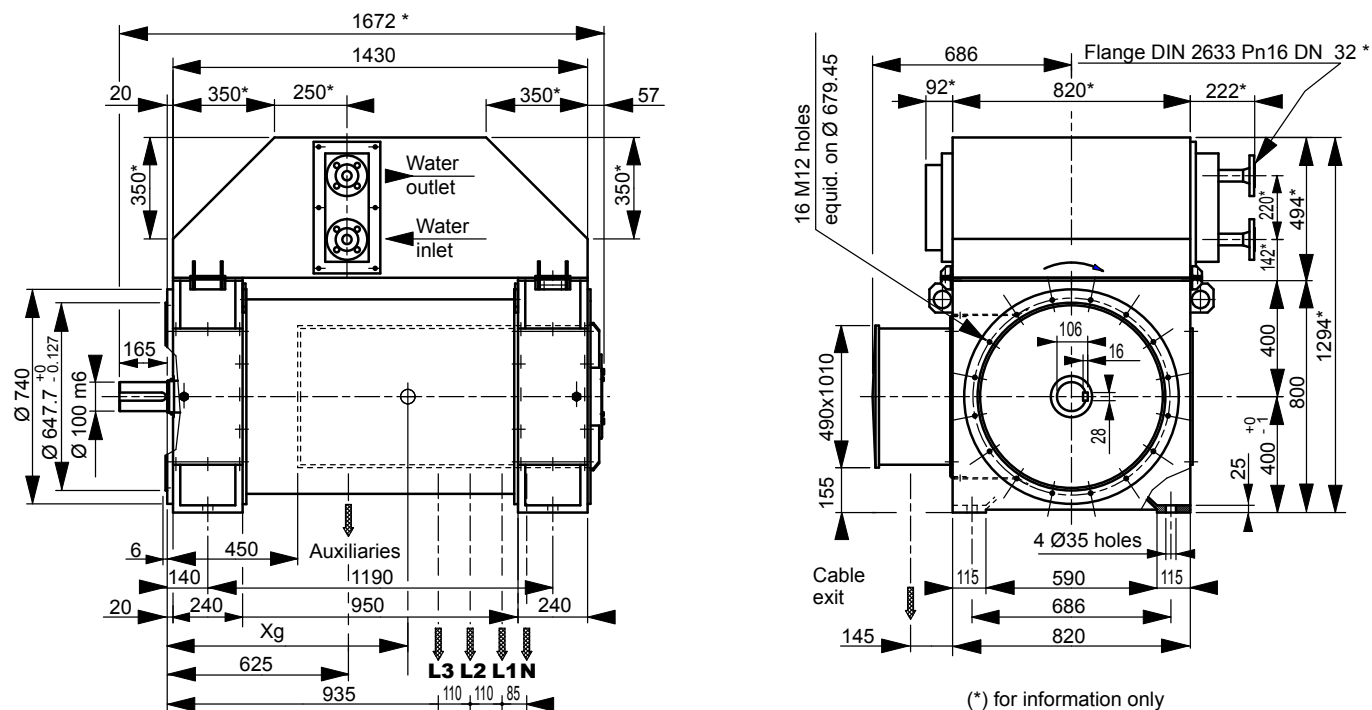
LSA 49.1 IC 06 dimensions



Dimensions (mm) and weights (kg)*		
Type	Xg	Weight
LSA 49.1 IC06 L2	695	2281
LSA 49.1 IC06 L6	716	2610
LSA 49.1 IC06 L9	735	2815

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.

LSA 49.1 IC 08 dimensions



Dimensions (mm) and weights (kg)*

Type	Xg	Weight
LSA 49.1 IC08 L2	695	2000
LSA 49.1 IC08 L6	716	2330
LSA 49.1 IC08 L9	735	2530

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.

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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.