Nidec Power

LSA 49.3

Low Voltage Alternator
IC6 / CACA / TEAAC - 4 poles

435 to 660 kVA - 50 Hz / 545 to 825 kVA - 60 Hz

Electrical and mechanical data

LEROY-SOMER™

The best of performance

The Leroy-Somer™ LSA 49.3 IC6 alternator is a totally enclosed air-cooled machine for special applications.
Cooling is performed by an air/air exchanger (cooling index: IC6A1A1 in accordance with standard IEC 60034-6).

Standards

The Leroy-Somer™ LSA 49.3 IC6 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.
The Leroy-Somer™ LSA 49.3 IC6 alternator can be integrated in EC marked generator set, and bears EC, UKCA 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 (3 wires + neutral), standard 6-wire (6S)
- Voltage range:
  - 50 Hz: 380V - 415V (440V)
  - 60 Hz: 380V - 480V
- High efficiency and motor starting capacity
- Other voltages are possible with optional adapted windings:
  - 50 Hz: 440V (n° 7), 500V (n° 9), 550V (n° 22), 600V (n° 23), 690V (n° 10)
  - 60 Hz: 380V and 416V (n° 8), 600V (n° 9), 690V (n° 22)

Excitation and regulation system

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

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

Protection system and options

- IP55 enclosed alternator
- Options:
  - Space heater and stator thermal protection (PT100)
  - Bearing temperature sensors
  - Rotor earth brush
  - Insulated ball bearing
  - Stainless tube exchanger
  - Other options: on request

Mechanical construction

- Compact and rigid assembly to better withstand generator vibrations
- Steel frame
- Cast iron endshields and bracket body
- Two-bearing configuration
- Half-key balancing
- Regreasable bearings
- Standard direction of rotation: clockwise when looking at the shaft end view (for anti-clockwise, derate the machine by 5%)

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 phase, neutral and auxiliary circuits (space heaters + thermal protection)

General characteristics

Insulation class	H	Excitation system	AREP
Winding pitch	2/3 (wind.6S)	AVR type	D550
Number of wires	6	Voltage regulation (*)	± 0.25%
Protection	IP55	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 m^3/s (50 Hz) / 1.2 m^3/s (60 Hz)	Waveform: IEC = THF (**)	< 2%

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

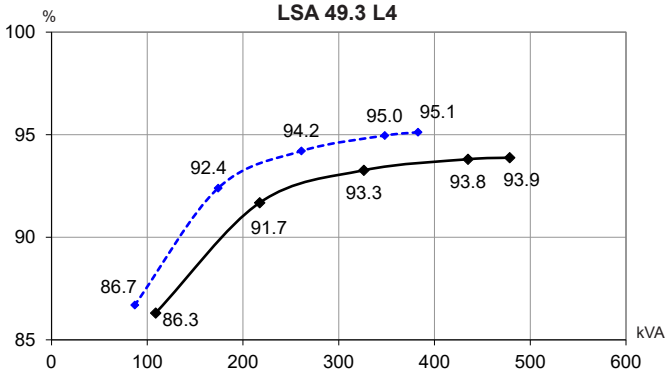
Ratings 50 Hz - 1500 R.P.M.

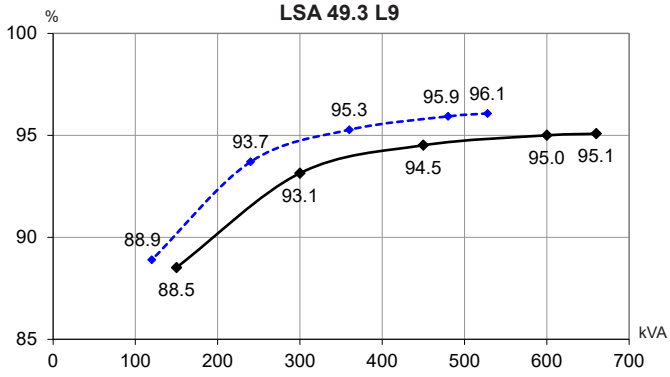
kVA / kW - P.F. = 0.8																
Duty/T°C		Continuous duty/40°C				Continuous duty/40°C				Stand-by/40°C				Stand-by/27°C			
Class/T°K		H/125°K				F/105°K				H/150°K				H/163°K			
Phase		**3 ph.**				**3 ph.**				**3 ph.**				**3 ph.**			
Y		380V	**400V**	415V	440V	380V	**400V**	415V	440V	380V	**400V**	415V	440V	380V	**400V**	415V	440V
LSA 49.3 L4	kVA	435	**435**	435	410	396	**396**	396	360	461	**461**	461	435	479	**479**	479	451
	kW	*348*	***348***	*348*	*328*	*317*	***317***	*317*	*288*	*369*	***369***	*369*	*348*	*383*	***383***	*383*	*361*
LSA 49.3 L6	kVA	480	**480**	480	455	437	**437**	437	398	509	**509**	509	482	528	**528**	528	500
	kW	*384*	***384***	*384*	*364*	*349*	***349***	*349*	*318*	*407*	***407***	*407*	*386*	*422*	***422***	*422*	*400*
LSA 49.3 L8	kVA	540	**540**	540	510	491	**491**	491	447	572	**572**	572	541	594	**594**	594	561
	kW	*432*	***432***	*432*	*408*	*393*	***393***	*393*	*358*	*458*	***458***	*458*	*432*	*475*	***475***	*475*	*449*
LSA 49.3 L9	kVA	600	**600**	600	570	546	**546**	546	496	636	**636**	636	604	660	**660**	660	627
	kW	*480*	***480***	*480*	*456*	*437*	***437***	*437*	*397*	*509*	***509***	*509*	*483*	*528*	***528***	*528*	*502*
LSA 49.3 L10	kVA	660	**660**	660	627	601	**601**	601	546	700	**700**	700	665	726	**726**	726	689
	kW	*528*	***528***	*528*	*502*	*480*	***480***	*480*	*437*	*560*	***560***	*560*	*532*	*581*	***581***	*581*	*551*

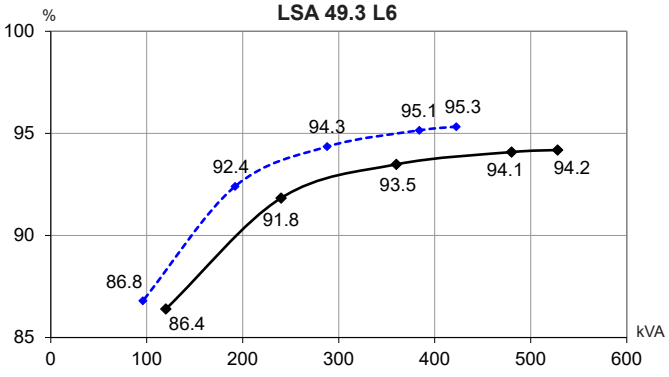
Ratings 60 Hz - 1800 R.P.M.

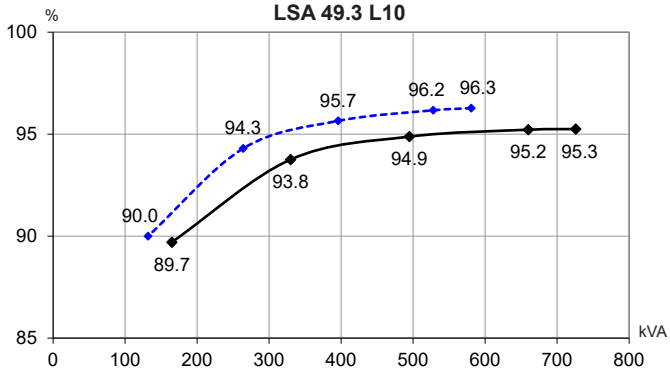
kVA / kW - P.F. = 0.8																	
Duty/T°C		Continuous duty/40°C				Continuous duty/40°C				Stand-by/40°C				Stand-by/27°C			
Class/T°K		H/125°K				F/105°K				H/150°K				H/163°K			
Phase		**3 ph.**				**3 ph.**				**3 ph.**				**3 ph.**			
Y		380V	416V	440V	**480V**	380V	416V	440V	**480V**	380V	416V	440V	**480V**	380V	416V	440V	**480V**
LSA 49.3 L4	kVA	545	545	545	**545**	496	496	496	**496**	578	578	578	**578**	600	600	600	**600**
	kW	*436*	*436*	*436*	***436***	*397*	*397*	*397*	***397***	*462*	*462*	*462*	***462***	*480*	*480*	*480*	***480***
LSA 49.3 L6	kVA	600	600	600	**600**	546	546	546	**546**	636	636	636	**636**	660	660	660	**660**
	kW	*480*	*480*	*480*	***480***	*437*	*437*	*437*	***437***	*509*	*509*	*509*	***509***	*528*	*528*	*528*	***528***
LSA 49.3 L8	kVA	675	675	675	**675**	614	614	614	**614**	716	716	716	**716**	743	743	743	**743**
	kW	*540*	*540*	*540*	***540***	*491*	*491*	*491*	***491***	*572*	*572*	*572*	***572***	*594*	*594*	*594*	***594***
LSA 49.3 L9	kVA	750	750	750	**750**	683	683	683	**682**	795	795	795	**795**	825	825	825	**825**
	kW	*600*	*600*	*600*	***600***	*546*	*546*	*546*	***546***	*636*	*636*	*636*	***636***	*660*	*660*	*660*	***660***
LSA 49.3 L10	kVA	825	825	825	**825**	751	751	751	**751**	875	875	875	**875**	907	907	907	**907**
	kW	*660*	*660*	*660*	***660***	*601*	*601*	*601*	***601***	*700*	*700*	*700*	***700***	*726*	*726*	*726*	***726***

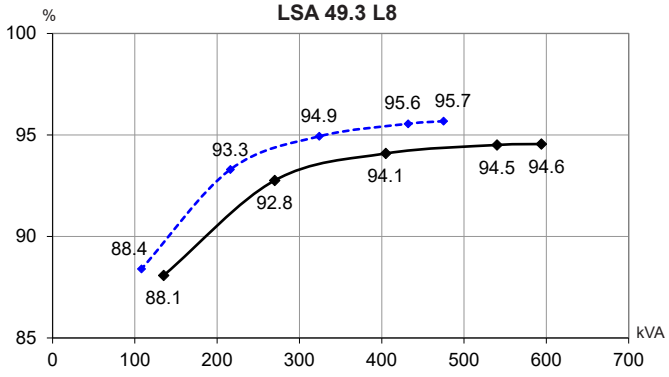
Efficiencies 400V - 50 Hz (— P.F.: 0.8) (--- P.F.: 1)











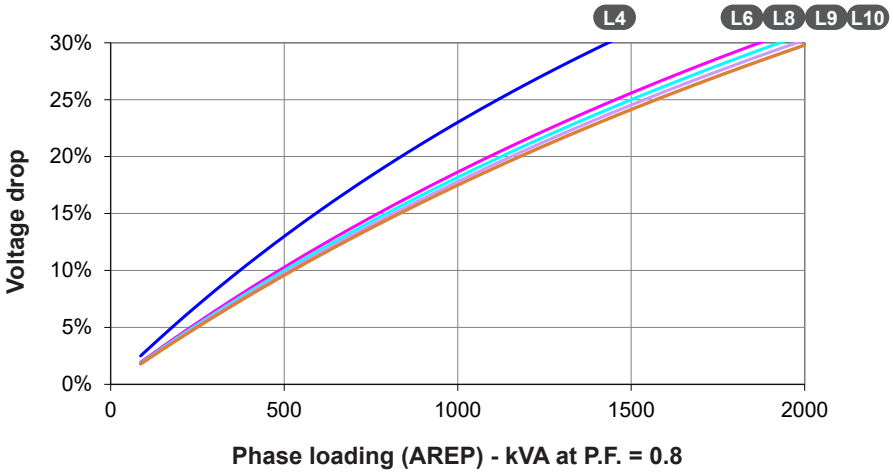
Reactances (%). Time constants (ms) - Class H / 400 V

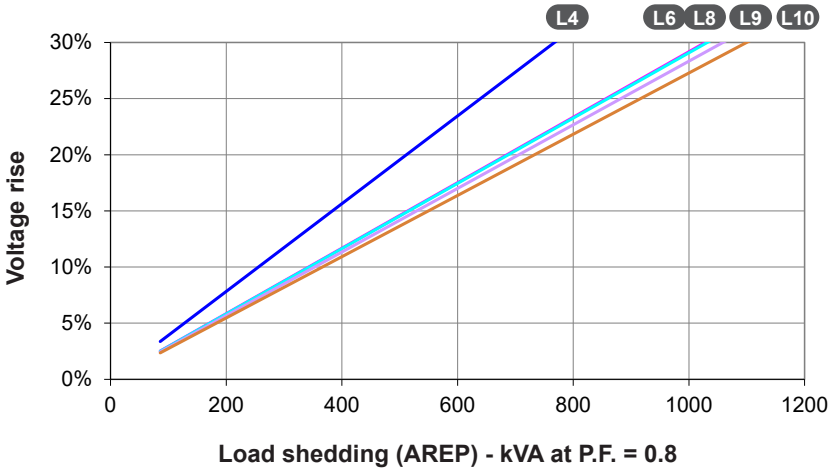
		L4	L6	L8	L9	L10
Kcc	Short-circuit ratio	0.51	0.64	0.51	0.63	0.52
Xd	Direct-axis synchronous reactance unsaturated	231	193	229	200	230
Xq	Quadrature-axis synchronous reactance unsaturated	118	98	117	102	117
T'do	No-load transient time constant	2002	2074	2094	2138	2153
X'd	Direct-axis transient reactance saturated	11.5	9.3	10.9	9.3	10.6
T'd	Short-circuit transient time constant	100	100	100	100	100
X"d	Direct-axis subtransient reactance saturated	9.2	7.4	8.7	7.4	8.5
T"d	Subtransient time constant	10	10	10	10	10
X"q	Quadrature-axis subtransient reactance saturated	10.7	8.4	9.8	8.2	9.3
Xo	Zero sequence reactance	0.48	0.39	0.46	0.39	0.44
X2	Negative sequence reactance saturated	10	7.9	9.2	7.8	8.9
Ta	Armature time constant	15	15	15	15	15

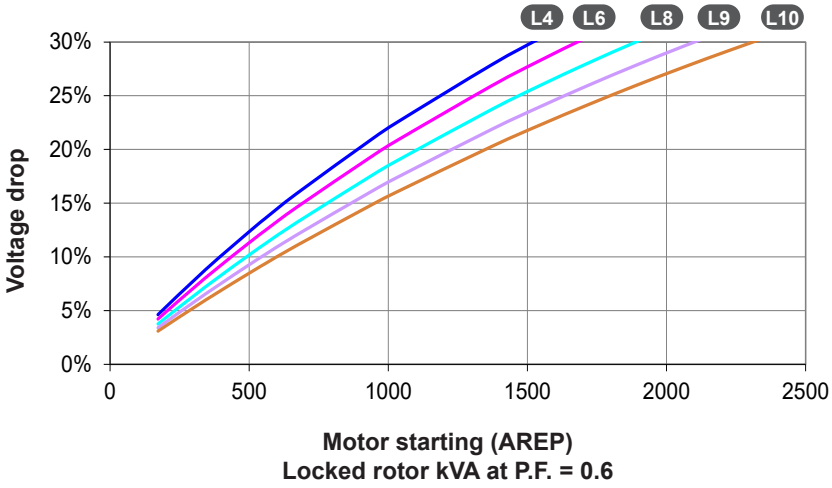
Other class H / 400 V data

io (A)	No-load excitation current	0.97	1.08	0.87	0.99	0.9
ic (A)	On-load excitation current	2.81	2.68	2.52	2.5	2.58
uc (V)	On-load excitation voltage	35.1	30.8	31.4	28.9	29.6
ms	Response time (ΔU = 20% transient)	500	500	500	500	500
kVA	Start (ΔU = 20% continuous or 30% transient)	1520	1680	1890	2100	2310
%	Transient ΔU (on-load 4/4) - P.F.: 0.8 $_{LAG}$	7.5	8.8	1.5	8.9	9.9
W	No-load losses	14200	15591	15009	16019	15464
W	Heat dissipation	22979	24160	25108	25240	26512

Transient voltage variation 400V - 50 Hz

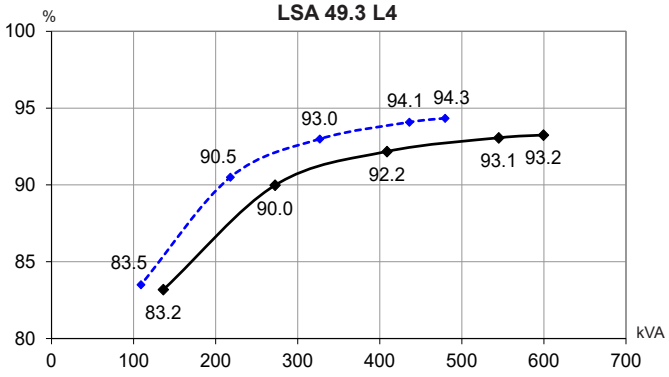


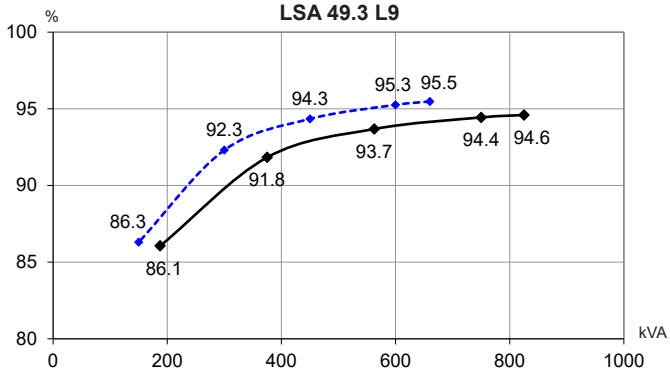


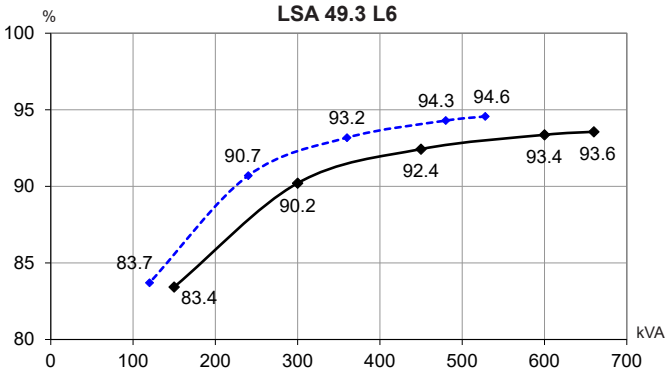


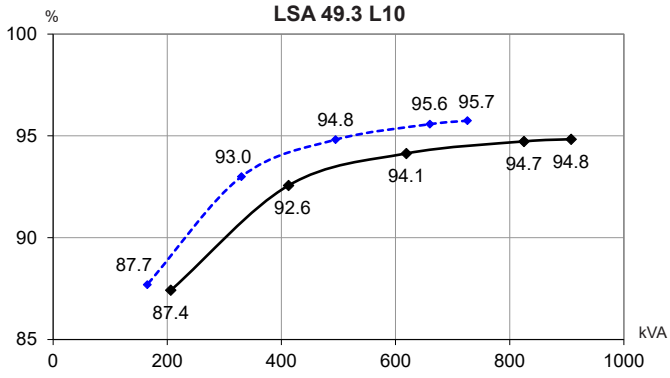
1) For a starting P.F. other than 0.6, the starting kVA must be multiplied by K = Sine P.F. / 0.8
2) For voltages other than 400V (Y), 230V(Δ) at 50 Hz, then kVA must be multiplied by $(400/U)^2$ or $(230/U)^2$.

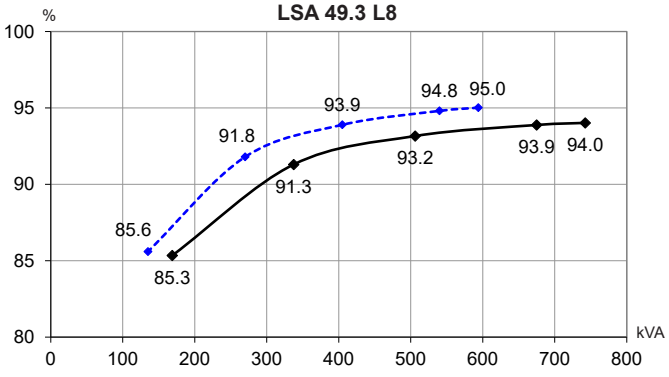
Efficiencies 480V - 60 Hz (— P.F.: 0.8) (--- P.F.: 1)











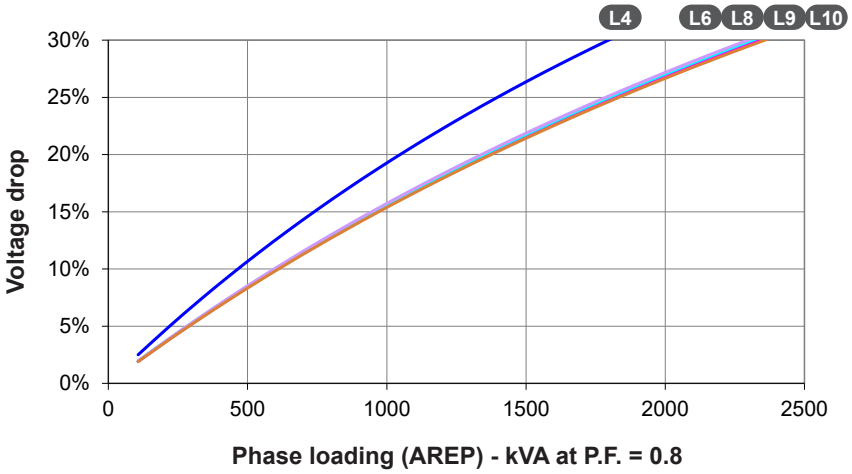
Reactances (%). Time constants (ms) - Class H / 480 V

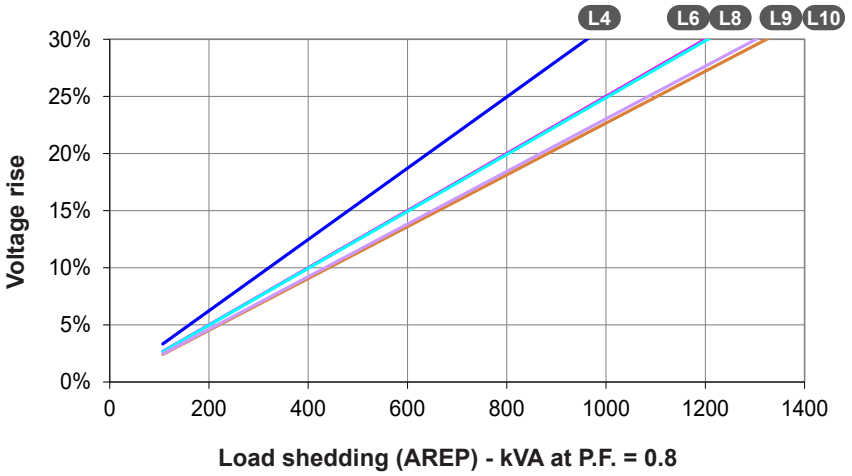
		L4	L6	L8	L9	L10
Kcc	Short-circuit ratio	0.49	0.61	0.49	0.6	0.5
Xd	Direct-axis synchronous reactance unsaturated	241	201	238	208	239
Xq	Quadrature-axis synchronous reactance unsaturated	123	103	121	106	122
T'do	No-load transient time constant	2002	2074	2094	2138	2153
X'd	Direct-axis transient reactance saturated	12	9.7	11.4	9.7	11.1
T'd	Short-circuit transient time constant	100	100	100	100	100
X"d	Direct-axis subtransient reactance saturated	9.6	7.7	9.1	7.8	8.8
T"d	Subtransient time constant	10	10	10	10	10
X"q	Quadrature-axis subtransient reactance saturated	11.2	8.7	10.2	8.5	9.7
Xo	Zero sequence reactance	0.5	0.41	0.48	0.41	0.46
X2	Negative sequence reactance saturated	10.4	8.2	9.6	8.1	9.3
Ta	Armature time constant	15	15	15	15	15

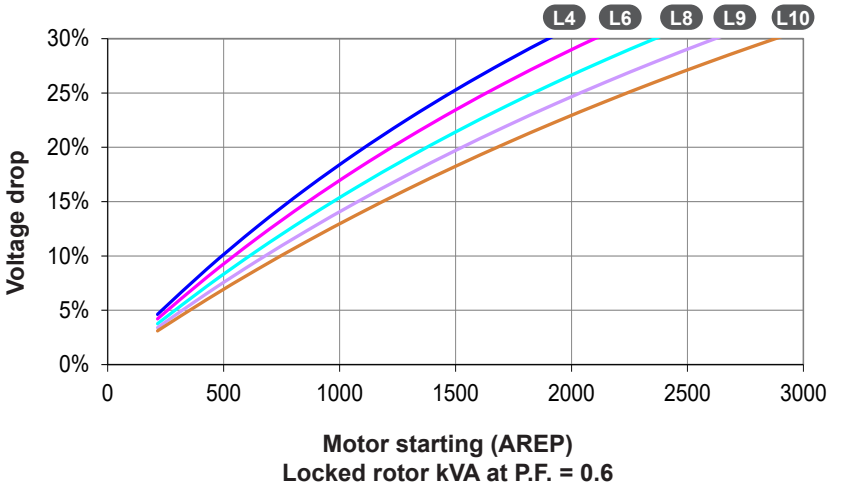
Other class H / 480 V data

io (A)	No-load excitation current	0.97	1.08	0.87	0.99	0.9
ic (A)	On-load excitation current	2.88	2.74	2.57	2.56	2.63
uc (V)	On-load excitation voltage	35.9	31.5	32.1	29.5	30.2
ms	Response time (ΔU = 20% transient)	500	500	500	500	500
kVA	Start (ΔU = 20% continuous or 30% transient)	1900	2100	2360	2620	2880
%	Transient ΔU (on-load 4/4) - P.F.: 0.8 $_{LAG}$	7.8	9.1	1.5	9.2	10.2
W	No-load losses	23243	25175	24412	25619	24868
W	Heat dissipation	32493	34117	35178	35354	36742

Transient voltage variation 480V - 60 Hz





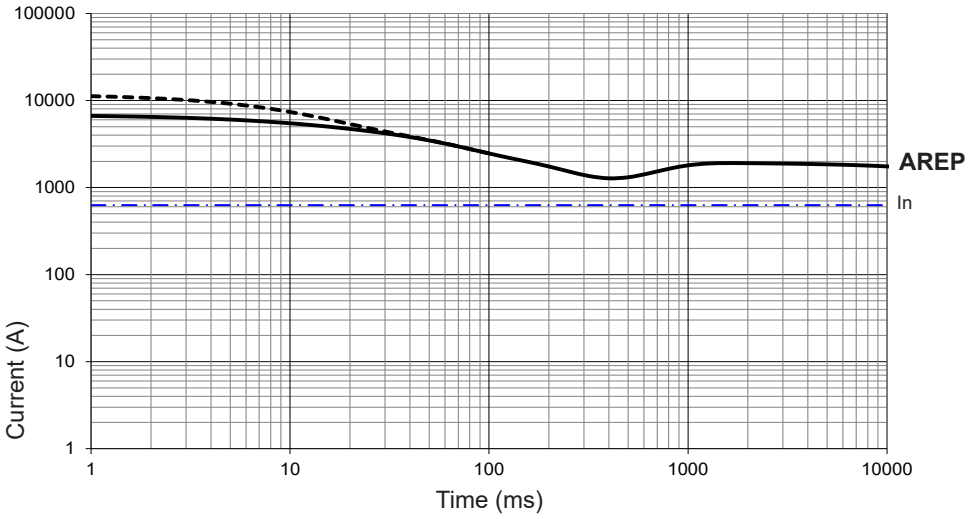


1) For a starting P.F. other than 0.6, the starting kVA must be multiplied by K = Sine P.F. / 0.8
2) For voltages other than 480V (Y), 277V (Δ), 240V (YY) at 60 Hz, then kVA must be multiplied by $(480/U)^2$ or $(277/U)^2$ or $(240/U)^2$.

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

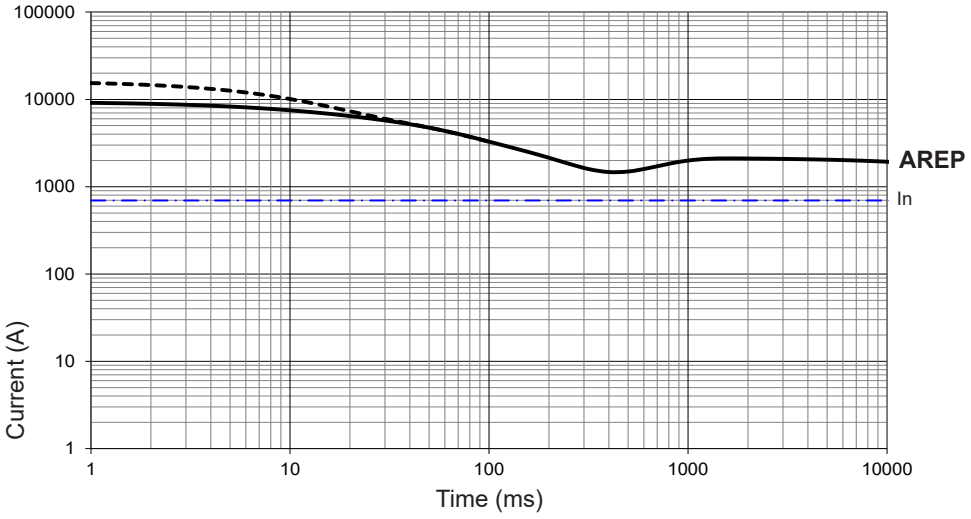
LSA 49.3 L4

Symmetrical ——
Asymmetrical - - -



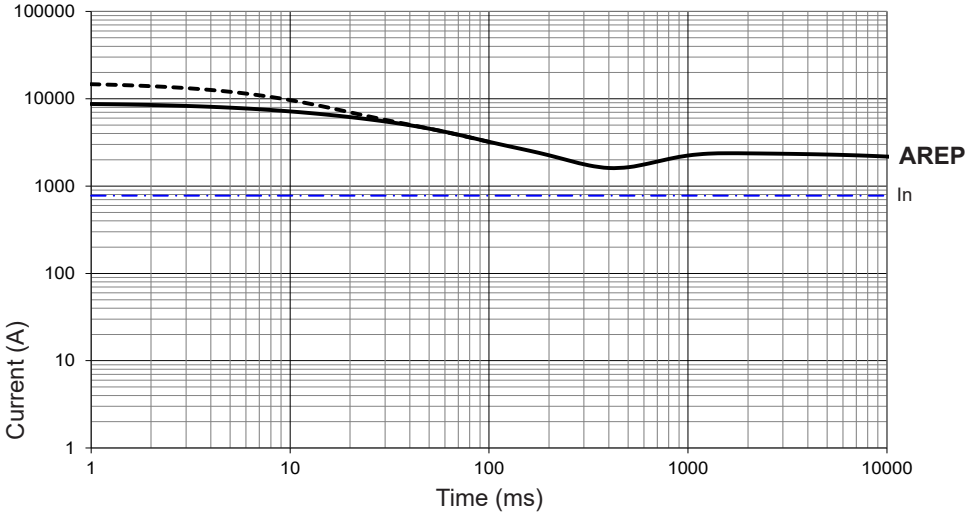
LSA 49.3 L6

Symmetrical ——
Asymmetrical - - -



LSA 49.3 L8

Symmetrical ——
Asymmetrical - - -

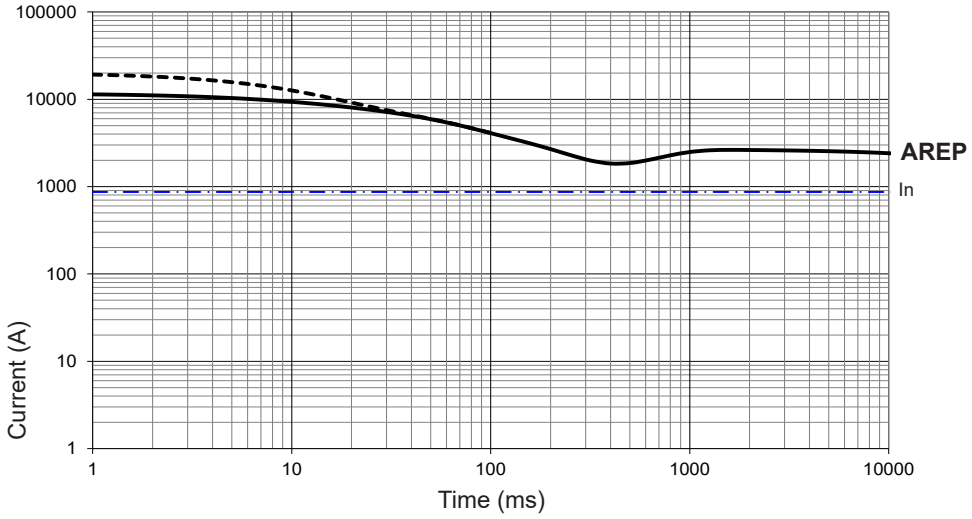


Influence due to connection
Curves shown are for star (Y) connection.
For other connections, use the following multiplication factors:
- Series delta : current value x 1.732 - Parallel star : current value x 2

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

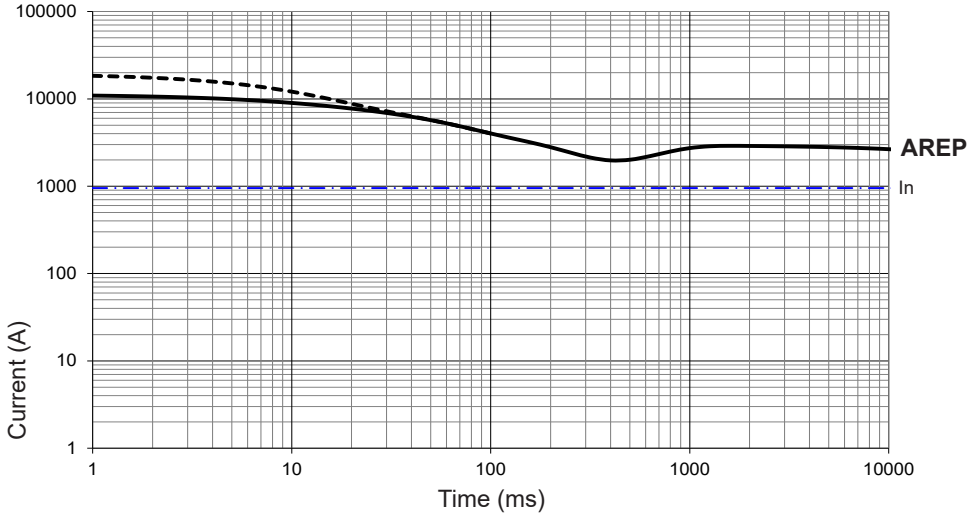
LSA 49.3 L9

Symmetrical ——
Asymmetrical - - -



LSA 49.3 L10

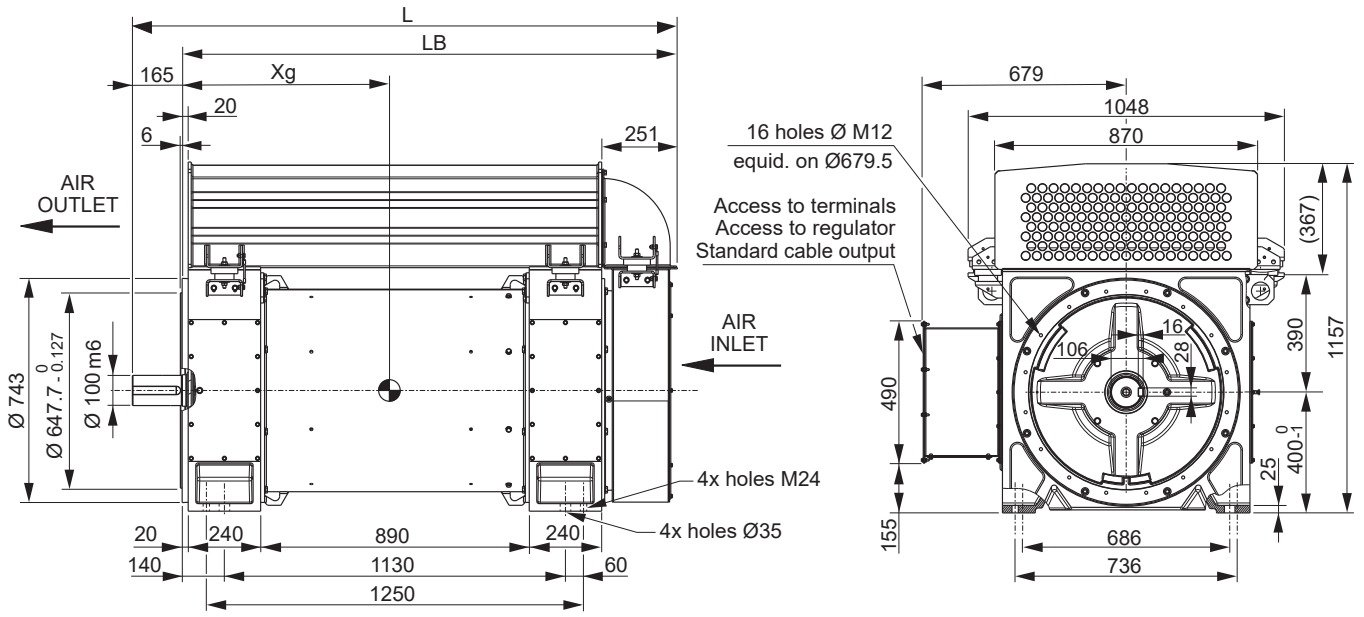
Symmetrical ——
Asymmetrical - - -



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.

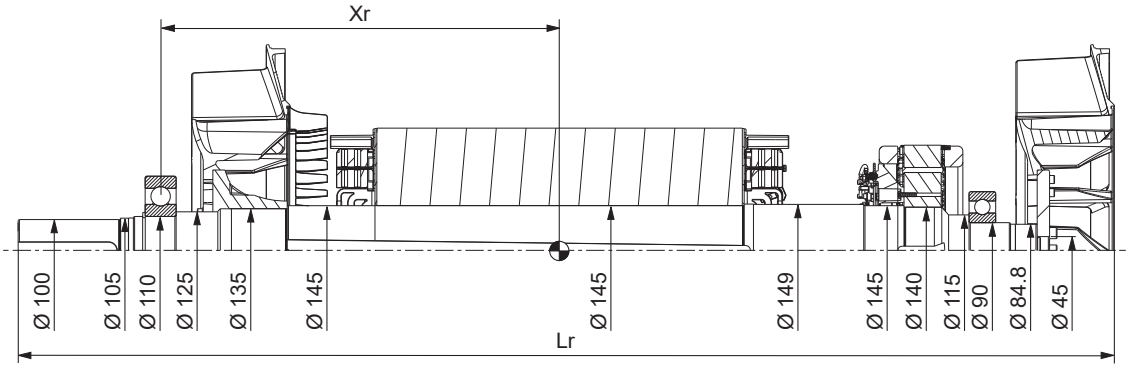
	3-phase	2-phase L/L	1-phase L/N
Instantaneous (max.)	1	0.87	1.3
Continuous	1	1.5	2.2
Maximum duration (AREP)	10 sec.	5 sec.	2 sec.

Two-bearing dimensions



Dimensions (mm) and weight				
Type	L	LB	Xg	Weight (kg)
LSA 49.3 L4	1806	1641	717	2128
LSA 49.3 L6	1806	1641	728	2265
LSA 49.3 L8	1806	1641	732	2307
LSA 49.3 L9	1806	1641	743	2450
LSA 49.3 L10	1806	1641	749	2506

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 L4	631	1770	576	9.43
LSA 49.3 L6	645	1770	629	10.52
LSA 49.3 L8	650	1770	654	11.06
LSA 49.3 L9	666	1770	699	12.03
LSA 49.3 L10	674	1770	717	12.40

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

Nidec

All for dreams

www.nidecpower.com

Connect with us at:

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