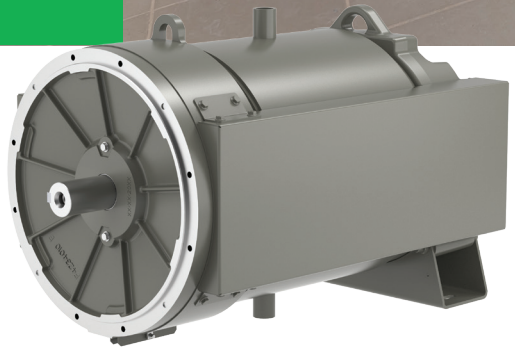
LSAH 42.3



Alternator for cogeneration installations

10 to 33 kVA - 50 Hz / 12.5 to 41 kVA - 60 Hz
Electrical and mechanical data

LEROY-SOMER™

Nidec
All for dreams

MAIN FEATURES AND OPTIONS

Built to heat

The LSAH range of alternators has been designed to maximize efficiency of cogeneration installations.

Thanks to its specific built-in coolant circuit, heat recovery is optimized and directly fed into the larger installation.

LSAH alternators are also perfectly suited for continuous service connected to the national grid.

The various design elements and construction features of LSAH machines make them highly performant and durable.

Standards

Nidec Leroy-Somer LSAH 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 LSAH 42.3 alternator can be integrated in EC marked generator set, and bears EC 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
- Voltage range:
  - 50 Hz: 400V
  - 60 Hz: 480V

  Other voltages: consult us
- High efficiency and motor starting capacity

Protection system and options

- Designed for an operating environment up to 80°C and a maximum cooling liquid temperature of 75°C
- Water flow: 3 to 10 m^3/h
- pH of water: 7<pH<8
- Degree of protection: IP 44
- Enclosed machine cooled by heat transfer fluid
- Options:
  - Bearing sensors
  - Thermal protection for stator windings (PT100 sensors)
  - Shaft height: adapted on request
  - Remote voltage potentiometer
  - Current transformer for parallel operation
  - AVR quick connector
  - Single-bearing configuration

Mechanical construction

- Compact rigid assembly to better withstand generator vibrations
- Steel frame and terminal box
- Cast iron and aluminum flanges and shields
- Two-bearing and single-bearing mounting
- Half-key balancing
- Greased for life ball bearings
- Direction of rotation: clockwise and anti-clockwise (without derating)
- Noise level: 82.2 dBA (IEC 60034-9)

Terminal box design

- Remote voltage regulator
- Terminal block for voltage reconnection

EXCITATION AND REGULATION SYSTEM

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

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

GENERAL CHARACTERISTICS

Insulation class	H	Excitation system	AREP
Winding pitch	2/3 (wind. 6S)	AVR type	D350
Number of wires	6	Voltage regulation (*)	± 0.25 %
Protection	IP 44	Short-circuit current	300 % (3 IN) : 10s
Cooling - Code	Water - IC7A1W7	Total Harmonic Distortion THD (**) in no-load	< 2 %
Altitude	≤ 1000 m	Total Harmonic Distortion THD (**) in linear load	< 4 %
Overspeed	2250 R.P.M.	Waveform: NEMA = TIF (**)	< 50
Water flow	3 to 10 m^3/h	Waveform: I.E.C. = THF (**)	< 1.5 %

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

RATING AND EFFICIENCY

	400V - 50Hz - 1500 R.P.M.						**480V - 60Hz - 1800 R.P.M.**					
Duty max. / T° C	Continuous / 80° C (environment) - 75° C (liquid)						Continuous / 80° C (environment) - 75° C (liquid)					
Class / T° K	**F / 70° K (Standard)**				**B / 45° K**		**F / 70° K (Standard)**				**B / 45° K**	
Phase	3 ph.				3 ph.		3 ph.				3 ph.	
Type	**P.F. 1**		**P.F. 0.8**		**P.F. 1**	**P.F. 0.8**	**P.F. 1**		**P.F. 0.8**		**P.F. 1**	**P.F. 0.8**
	kVA	η (%)	**kVA**	η (%)	**kVA**	**kVA**	**kVA**	η (%)	**kVA**	η (%)	**kVA**	**kVA**
	kW	4/4	kW	4/4	kW	kW	kW	4/4	kW	4/4	kW	kW
LSAH 42.3 VS0	**10**	*91.4*	**10**	*87.9*	**8**	**8**	**12.5**	*91.4*	**12.5**	*87.9*	**10**	**10**
	10		8		8	6	12.5		10		10	8
LSAH 42.3 S0	**15**	*92.4*	**15**	*89.3*	**12**	**12**	**19**	*92.4*	**19**	*89.3*	**15.2**	**15.2**
	15		12		12	10	19		15.2		15.2	12.2
LSAH 42.3 M1	**20**	*93.6*	**20**	*90.8*	**16**	**16**	**25**	*93.6*	**25**	*90.8*	**20**	**20**
	20		16		16	13	25		20		20	16
LSAH 42.3 VL6	**33**	*94.2*	**33**	*91.8*	**26.5**	**26**	**41**	*94.2*	**41**	*91.8*	**32.9**	**32.9**
	33		26.4		26.5	21	41		32.8		32.9	26.3

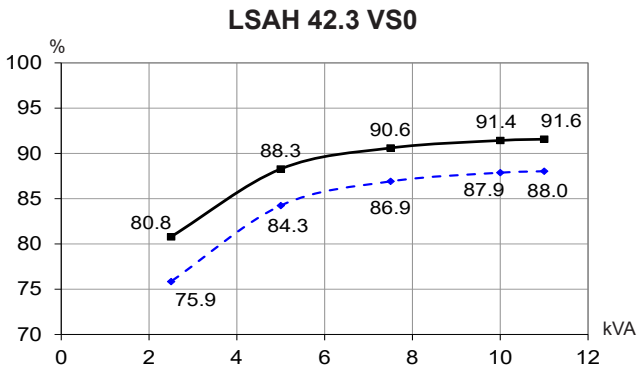
For other needs, please contact us.

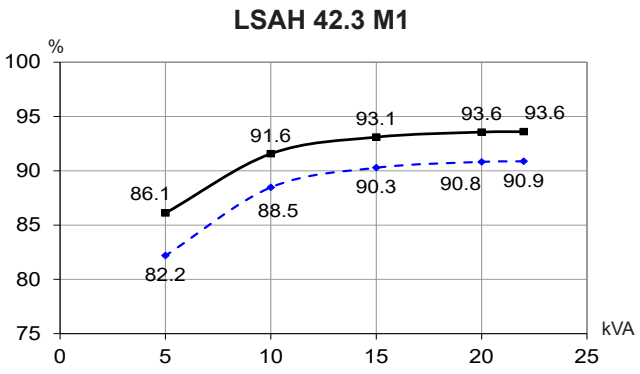
TEMPERATURE AND POWER

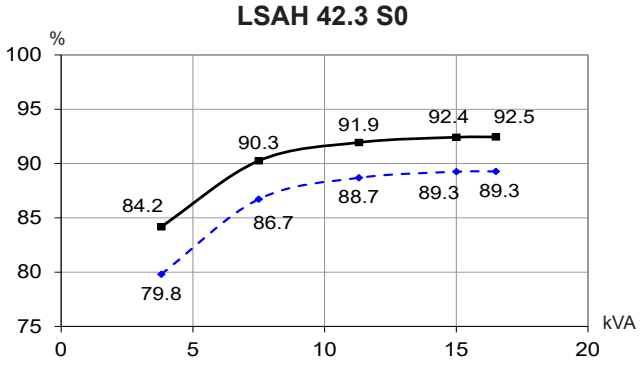
Power adjustment factor according to the coolant temperature

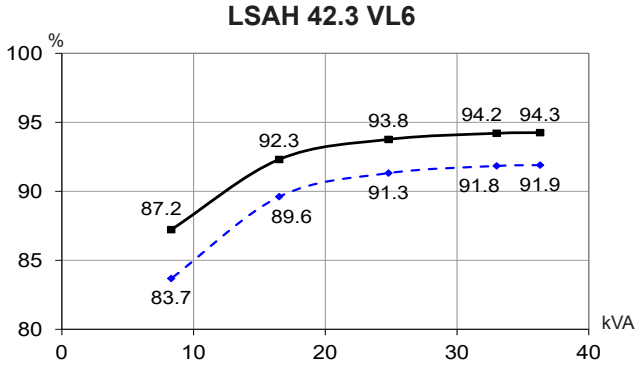
Coolant T °C	40 - 50 °C	60 - 75 °C	85 - 95 °C
Factor	1.03	1	0.97

EFFICIENCIES 400 V - 50 HZ (--- P.F.: 0.8) (— P.F.: 1) - CLASS F









REACTANCES (%). TIME CONSTANTS (MS) - CLASS F / 400 V - P.F. 1

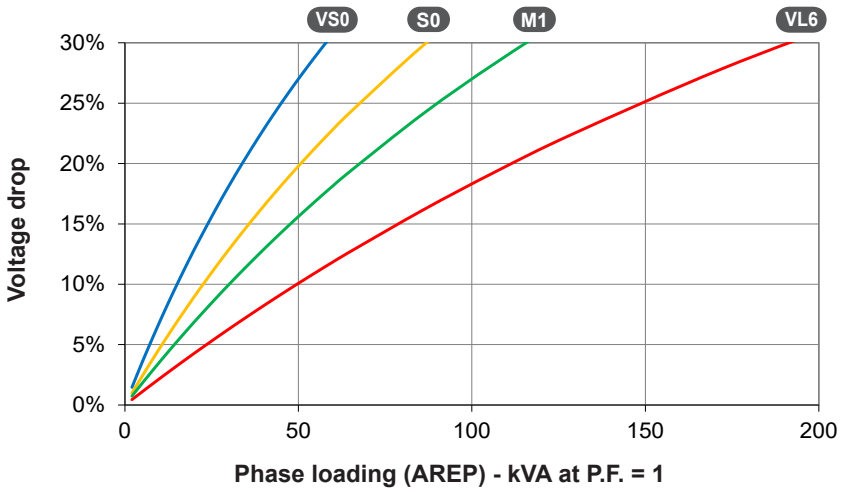
		VS0	S0	M1	VL6
Kcc	Short-circuit ratio	1	0.87	0.91	0.9
Xd	Direct-axis synchronous reactance unsaturated	101	118	112	113
Xq	Quadrature-axis synchronous reactance unsaturated	51	60	57	57
T'do	No-load transient time constant	480	535	607	701
X'd	Direct-axis transient reactance saturated	10.5	11	9.2	8
T'd	Short-circuit transient time constant	50	50	50	50
X"d	Direct-axis subtransient reactance saturated	5.2	5.5	4.6	4
T"d	Subtransient time constant	5	5	5	5
X"q	Quadrature-axis subtransient reactance saturated	7.4	7.7	6.6	5.7
Xo	Zero sequence reactance	0.44	0.45	0.38	0.33
X2	Negative sequence reactance saturated	6.36	6.64	5.62	4.91
Ta	Armature time constant	8	8	8	8

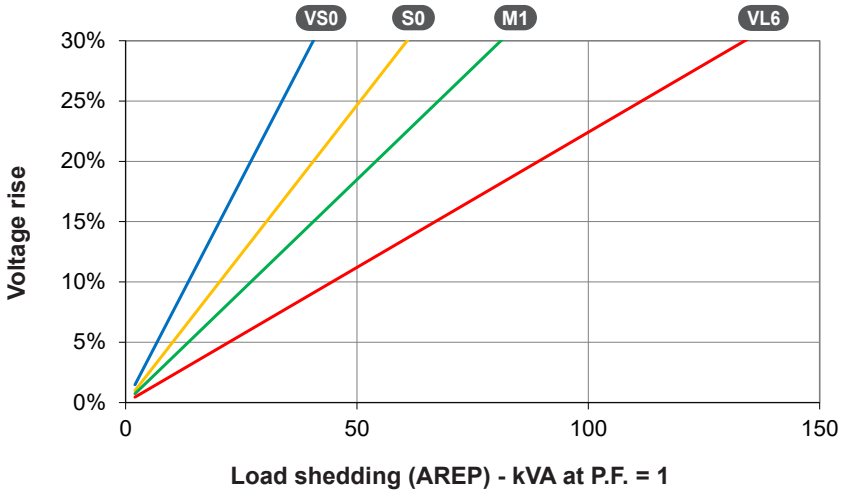
Other class F / 400 V data

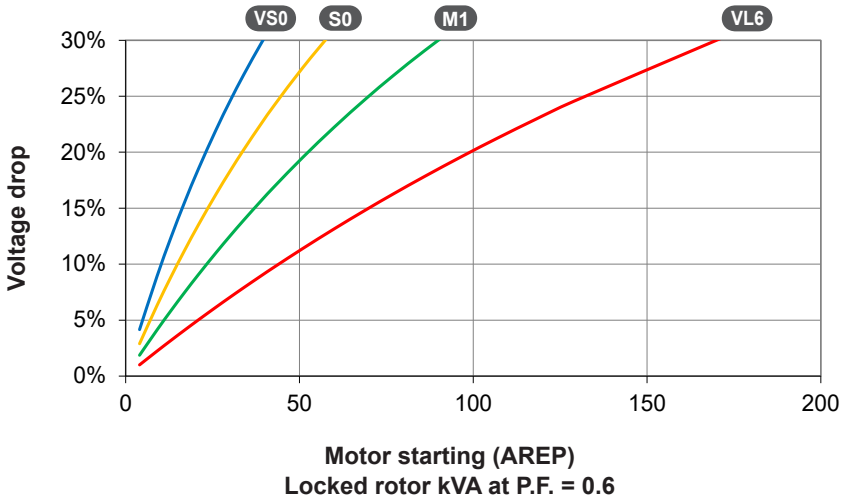
io (A)	No-load excitation current AREP	0.88	0.9	0.9	0.92
ic (A)	On-load excitation current AREP	1.3	1.45	1.4	1.46
uc (V)	On-load excitation voltage AREP	8.4	9.3	10.2	10.4
ms	Response time (ΔU = 20% transient)	500	500	500	500
kVA	Start (ΔU = 20% continuous or ΔU = 30% transient) AREP*	39	57	90	170
%	Transient ΔU (on-load 4/4) AREP - P.F.: 1 $_{LAG}$	7	7	7	7
W	No-load losses	631	740	848	1278
W	Heat dissipation	935	1230	1375	2029

* P.F. = 0.6

TRANSIENT VOLTAGE VARIATION 400 V - 50 HZ - CLASS F



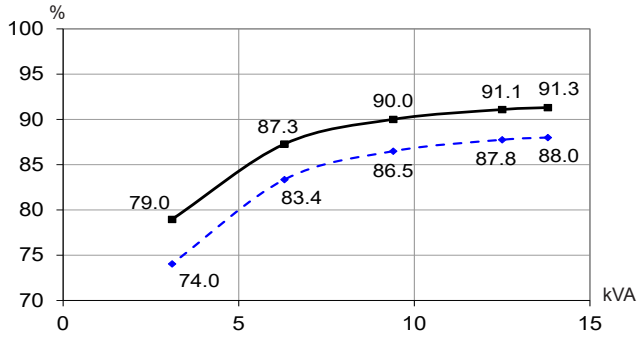




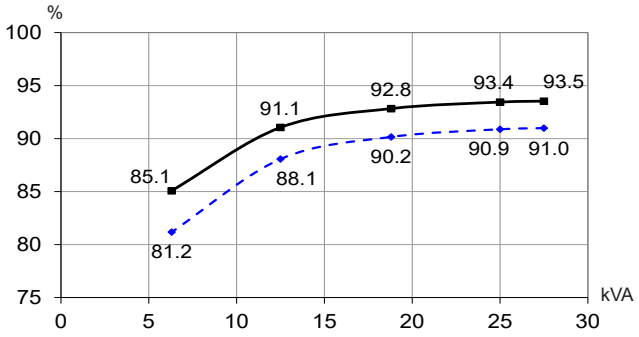
- For a starting P.F. other than 0.6, the starting kVA must be multiplied by K = Sine P.F. / 0.8
- For voltages other than 400V (Y), 230V (Δ) at 50 Hz, then kVA must be multiplied by $(400/U)^2$ or $(230/U)^2$.

EFFICIENCIES 480 V - 60 HZ (--- P.F.: 0.8) (— P.F.: 1) - CLASS F

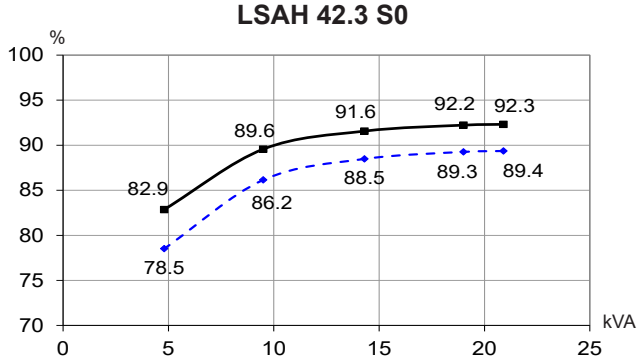
LSAH 42.3 VS0



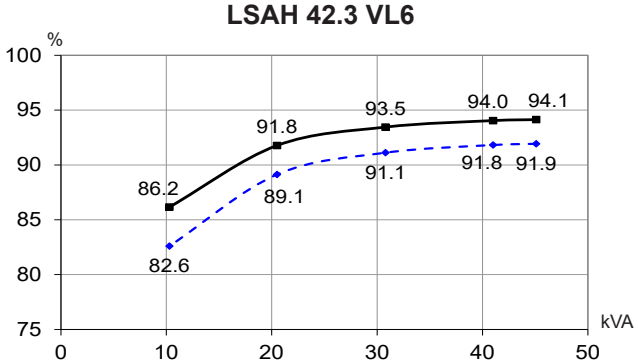
LSAH 42.3 M1



LSAH 42.3 S0



LSAH 42.3 VL6



REACTANCES (%). TIME CONSTANTS (MS) - CLASS F / 480 V - P.F. 1

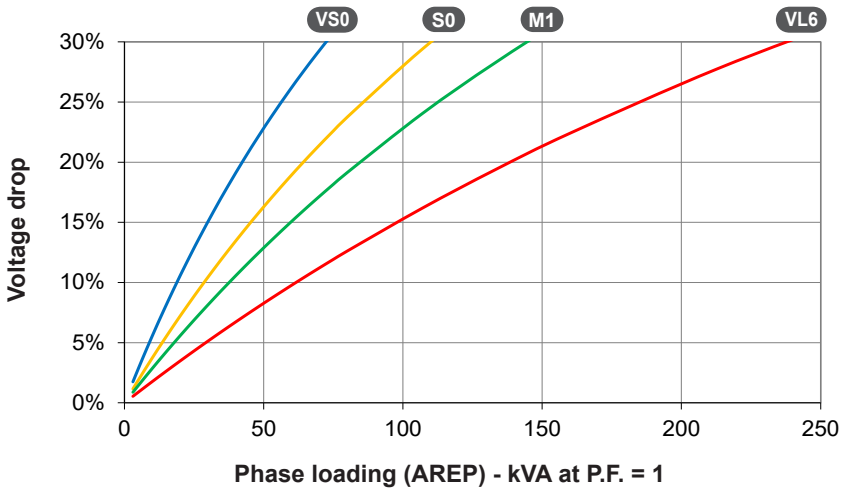
		VS0	S0	M1	VL6
Kcc	Short-circuit ratio	0.96	0.82	0.87	0.87
Xd	Direct-axis synchronous reactance unsaturated	105	124	117	117
Xq	Quadrature-axis synchronous reactance unsaturated	54	63	59	59
T'do	No-load transient time constant	480	535	607	701
X'd	Direct-axis transient reactance saturated	11	11.6	9.6	8.3
T'd	Short-circuit transient time constant	50	50	50	50
X"d	Direct-axis subtransient reactance saturated	5.5	5.8	4.8	4.1
T"d	Subtransient time constant	5	5	5	5
X"q	Quadrature-axis subtransient reactance saturated	7.7	8.2	6.8	5.9
Xo	Zero sequence reactance	0.45	0.48	0.4	0.34
X2	Negative sequence reactance saturated	6.63	7.01	5.85	5.08
Ta	Armature time constant	8	8	8	8

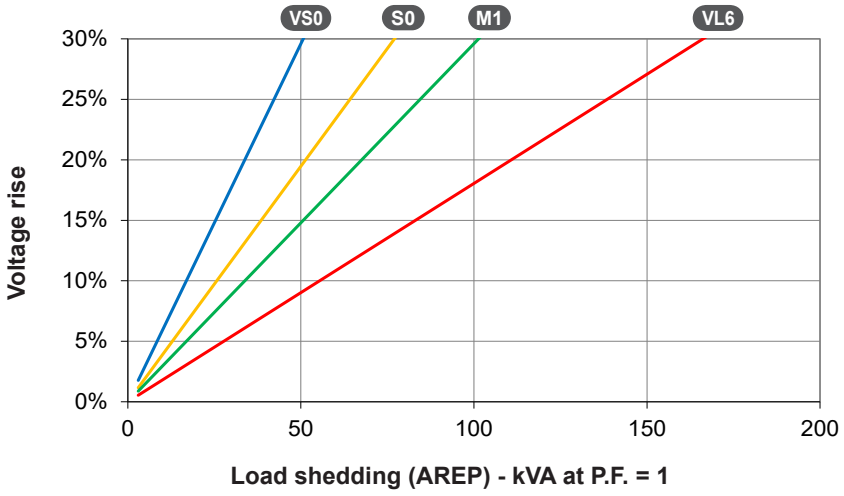
Other class F / 480 V data

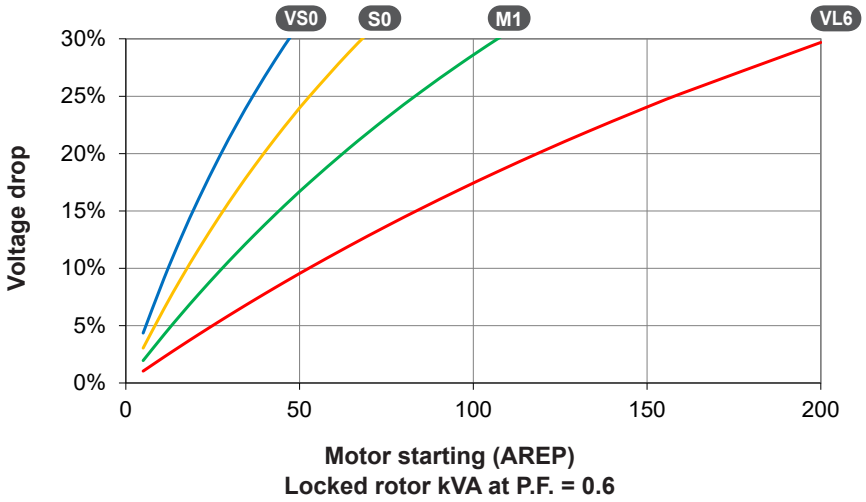
io (A)	No-load excitation current AREP	0.88	0.89	0.9	0.91
ic (A)	On-load excitation current AREP	1.32	1.48	1.43	1.46
uc (V)	On-load excitation voltage AREP	8.5	9.5	10.4	10.6
ms	Response time (ΔU = 20% transient)	500	500	500	500
kVA	Start (ΔU = 20% continuous or ΔU = 30% transient) AREP*	47	68	107	203
%	Transient ΔU (on-load 4/4) AREP - P.F.: 1 $_{LAG}$	7	7	7	7
W	No-load losses	904	1056	1178	1777
W	Heat dissipation	1221	1602	1753	2595

* P.F. = 0.6

TRANSIENT VOLTAGE VARIATION 480 V - 60 HZ - CLASS F





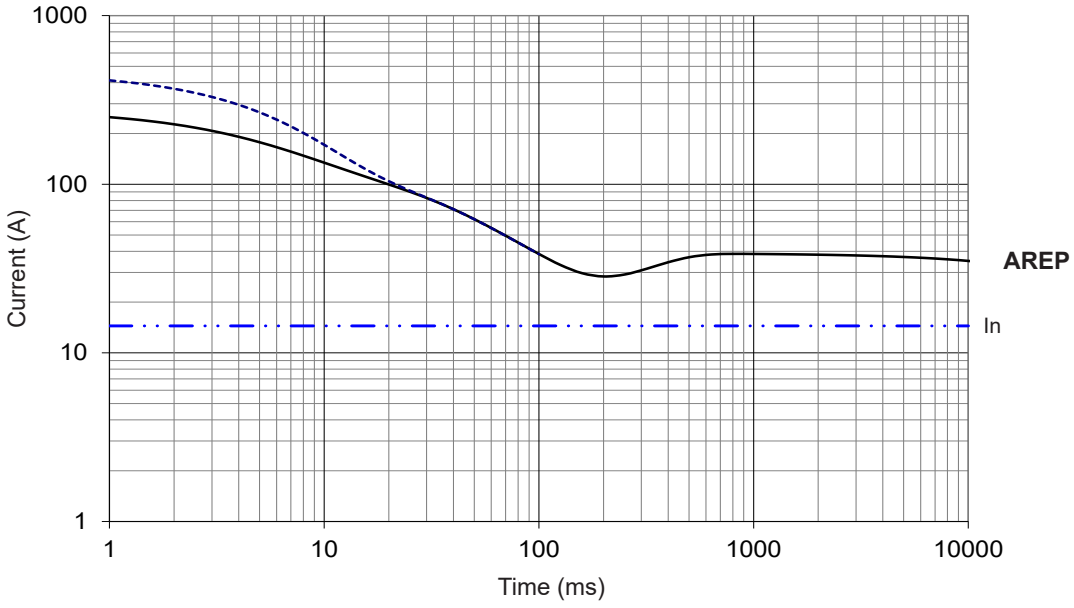


- For a starting P.F. other than 0.6, the starting kVA must be multiplied by K = Sine P.F. / 0.8
- For voltages other than 480V (Y), 277V (Δ), 240V (YY) at 60 Hz, then kVA must be multiplied by $(480/U)^2$ or $(277/U)^2$ or $(240/U)^2$.

CLASS F

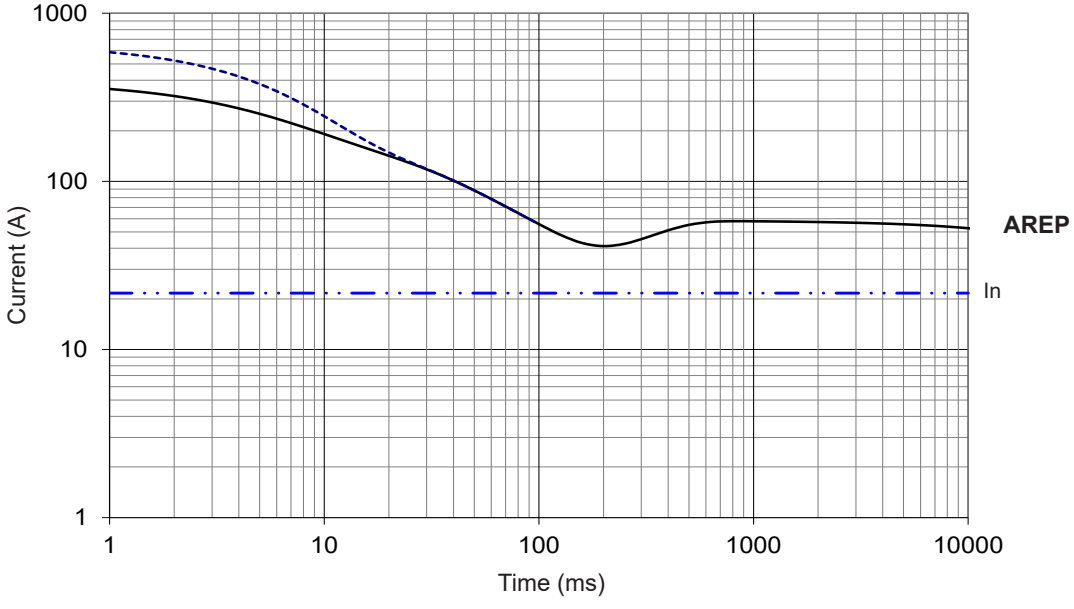
LSAH 42.3 VS0

Symmetrical ——
Asymmetrical - - -



LSAH 42.3 S0

Symmetrical ——
Asymmetrical - - -

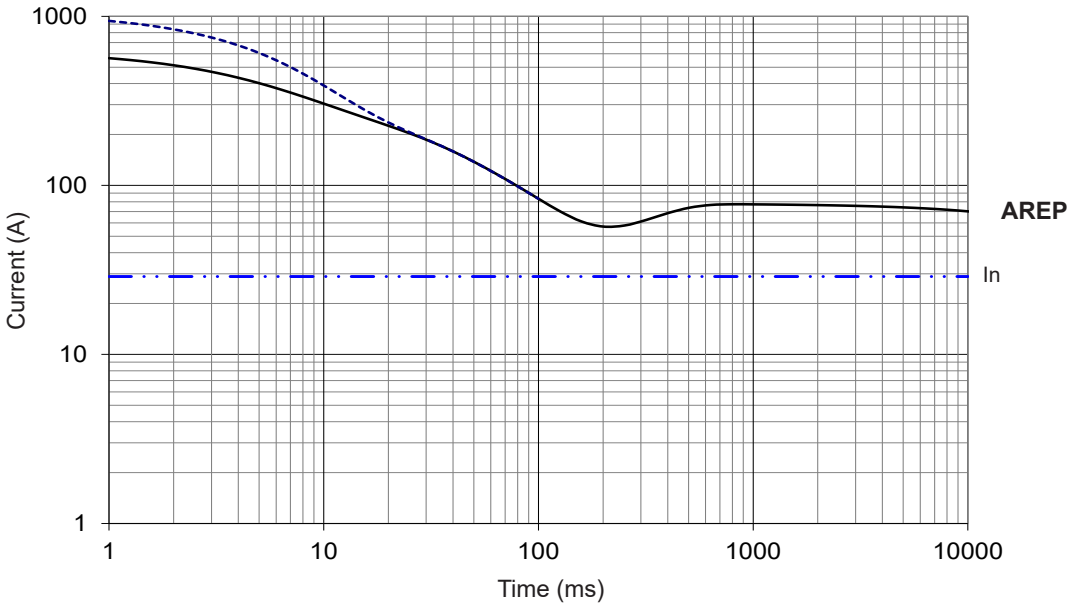


Influence due to connection
For (Δ) connection, use the following multiplication factor:
- Current value x 1.732.

CLASS F

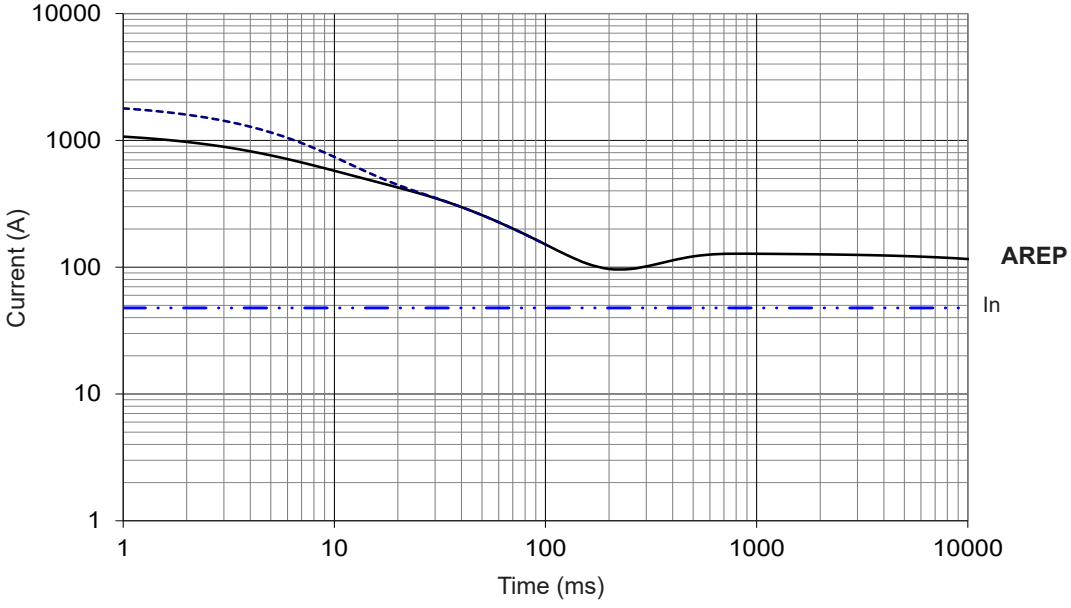
LSAH 42.3 M1

Symmetrical ——
Asymmetrical - - -



LSAH 42.3 VL6

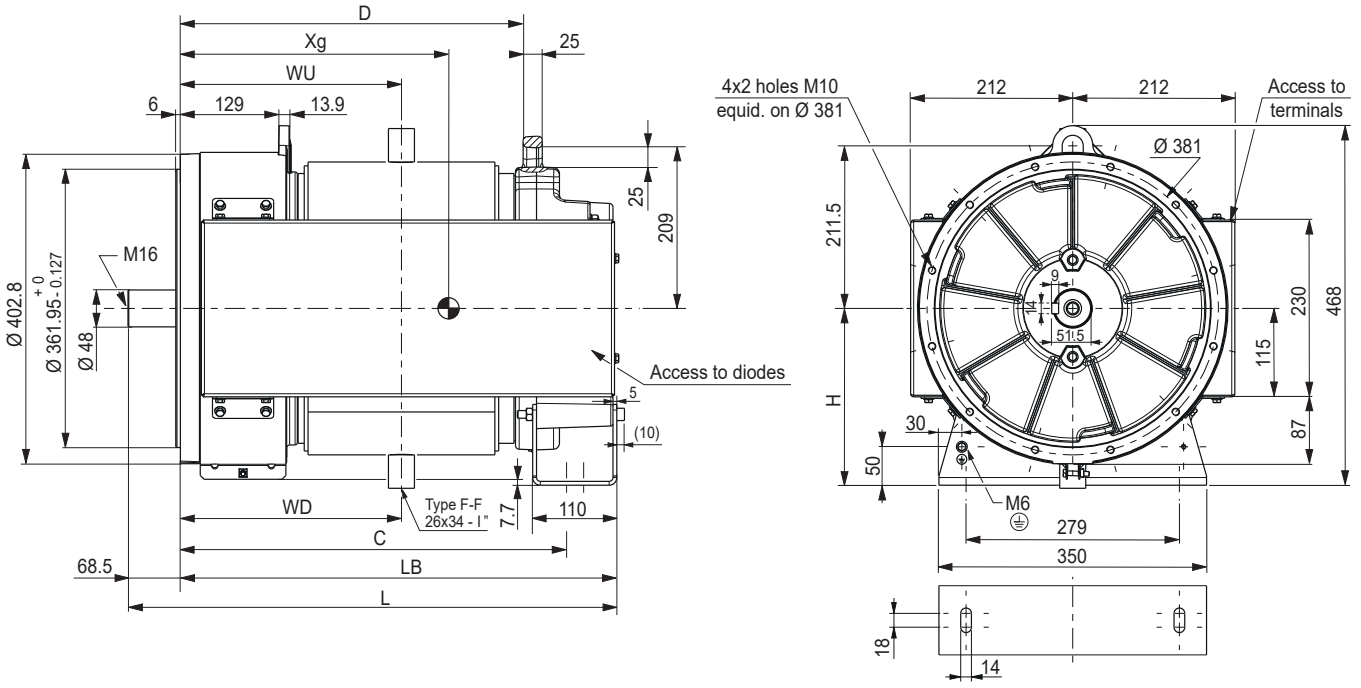
Symmetrical ——
Asymmetrical - - -



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.

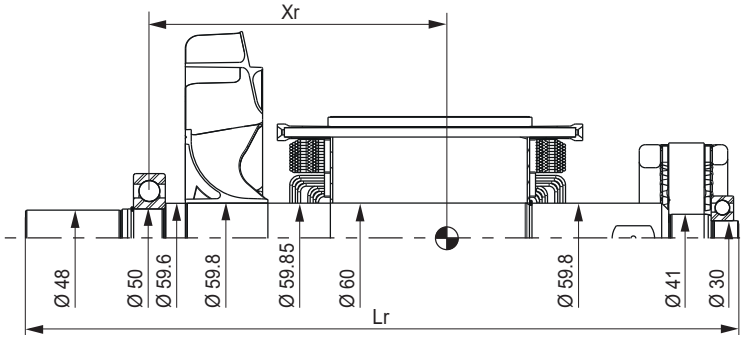
	3 - phase	2 - phase L / L	1 - phase L / N
Instantaneous (max.)	1	0.87	1.3
Continuous	1	1.5	2.2
Maximum duration (AREP)	10 sec.	5 sec.	2 sec.

TWO-BEARING DIMENSIONS - STANDARD



Dimensions (mm) and weight									
Type	L	LB	D	WU	Xg	WD	C	H	Weight (kg)
LSAH 42.3 VS0	545	476.5	354	242	235	242	412.5	230	157
LSAH 42.3 S0	570	501.5	379	254.5	256	254.5	437.5	230	178
LSAH 42.3 M1	615	546.5	424	277	287	277	482.5	230	207
LSAH 42.3 VL6	715	646.5	524	327	339	327	582.5	230	290

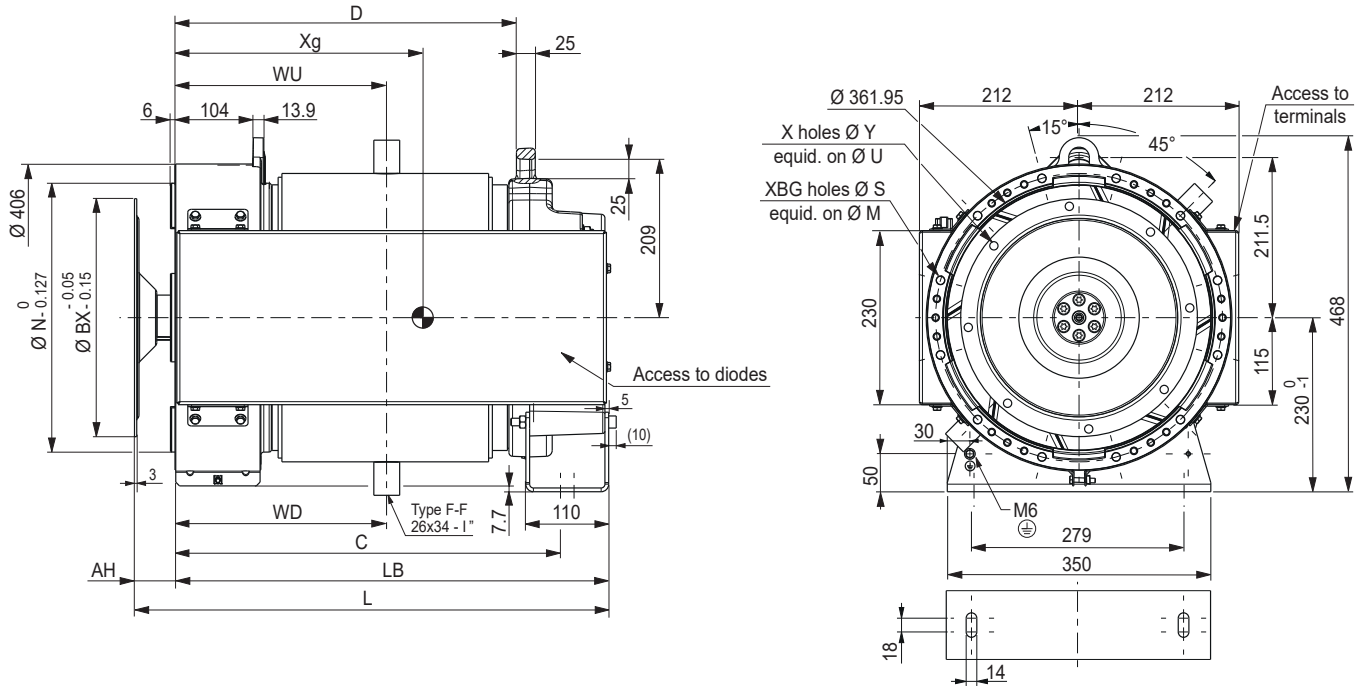
TORSIONAL ANALYSIS DATA



Centre of gravity: Xr (mm), Rotor length: Lr (mm), Weight: M (kg), Moment of inertia: J (kgm²): (4J = MD²)				
Type	Xr	Lr	M	J
LSAH 42.3 VS0	211	534.5	38	0.159
LSAH 42.3 S0	222.5	559.5	43	0.208
LSAH 42.3 M1	252.5	604.5	54	0.272
LSAH 42.3 VL6	294	704.5	77	0.395

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.

SINGLE-BEARING DIMENSIONS - OPTION



Dimensions (mm) and weight								
Type	L maxi*	LB	D	WU	Xg	WD	C	Weight (kg)
LSAH 42.3 VS0	513.5	451.5	329	217	231	217	387.5	140.5
LSAH 42.3 S0	538.5	476.5	354	229.5	252	229.5	412.5	161.5
LSAH 42.3 M1	583.5	521.5	399	252	283	252	457.5	190.5
LSAH 42.3 VL6	683.5	621.5	499	302	335	302	557.5	273.5

* L maxi = LB + AH maxi

Coupling	
Flange	**4**
Flex plate	
10	x
8	x
7 ½	x

Flange (mm)				
S.A.E.	N	M	S	XBG
4	361.95	381	11	12

Flex plate (mm)					
S.A.E.	BX	U	X	Y	AH
10	314.32	295.28	8	11	53.8
8	263.52	244.48	6	11	62
7 ½	241.3	222.25	8	9	30.2

For torsional analysis data or other request: 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.

LEROY-SOMER™

www.leroy-somer.com/epg

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Nidec

All for dreams

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