

LSA 53.2

Low Voltage Alternator - 4 pole

2650 to 3300 kVA - 50 Hz / 3150 to 3900 kVA - 60 Hz
Electrical and mechanical data

LEROY-SOMER™

Nidec
All for dreams

The best of performance

The Nidec Leroy-Somer LSA 53.2 alternator has been designed to offer you the best power generation performances. With its meticulous design and optimized architecture, the LSA 53.2 strikes the perfect balance between compactness, reliability, performance and longevity.

Whatever your application, the LSA 53.2 will meet your needs and will adapt to all situations.

Standards

Nidec Leroy-Somer LSA 53.2 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 LSA 53.2 alternator can be integrated in EC marked generator set, and bears EC, EAC 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)
- Voltage range:
 - 50 Hz: 380V - 400V - 415V
 - 60 Hz: 440V - 480V
- High efficiency and motor starting capacity
- Other voltages are possible with optional adapted windings:
 - 50 Hz: 440V (no. 7S), 500V (no. 9S), 600V (no. 23S), 690V (no. 52S)
 - 60 Hz: 380V and 416V (no. 8S), 600V (no. 9S), 690V (no. 22S)

Excitation and regulation system

| Excitation system | | | Regulation options | | |
|-------------------|------------|--------|--|----------------------|---------------------------------|
| AVR | AREP + PMI | PMG | C.T. Current transformer for paralleling | Mains paralleling | Remote voltage potentiometer |
| D550 | Standard | Option | √ | √ | √ |

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

Protection system and options

- These alternators are IP 23
- Complete winding protection for clean environments with relative humidity ≤ 95 %
- Options:
 - Filters on air inlet: derating 5%
 - Filters on air inlet and air outlet (IP 44): derating 10%
 - Reinforced winding protection for harsh environments and relative humidity greater than 95%
 - Space heater
 - Protection or metering CTs
 - Thermal protection for stator winding and/or bearings (PT100)

Mechanical construction

- Compact and rigid assembly to better withstand generator vibrations
- Steel frame
- Cast iron flanges and shields
- Two-bearing and single-bearing versions designed to be suitable for engines on the market
- Half-key balancing
- Regreasable bearings
- Clockwise rotation in standard

Terminal box design

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

General characteristics

| | | | |
|------------------|---|---|-------------------|
| Insulation class | H | Excitation system | AREP + PMI |
| Winding pitch | 2/3 (wind. 6S) | AVR type | D550 |
| Number of wires | 6 | Voltage regulation (*) | ± 0.25 % |
| Protection | IP 23 | Short-circuit current | 300% (3 IN) : 10s |
| Altitude | ≤ 1000 m | Total Harmonic Distortion THD (**) in no-load | < 4 % |
| Overspeed | 2250 R.P.M. | Waveform: NEMA = TIF (**) | < 50 |
| Air flow | 2.5 m ³ /s (50 Hz) - 2.8 m ³ /s (60 Hz) | Waveform: I.E.C. = THF (**) | < 2 % |

(*) steady state (**) between phases

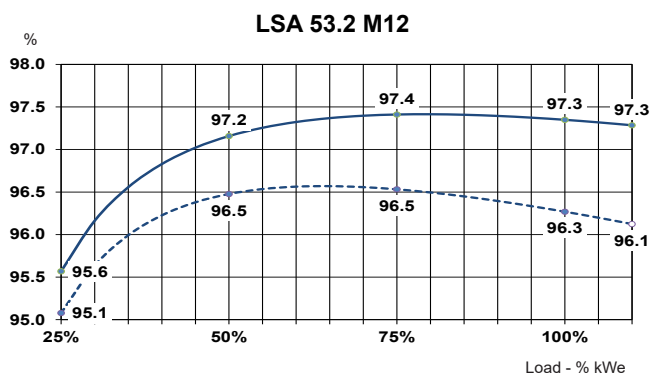
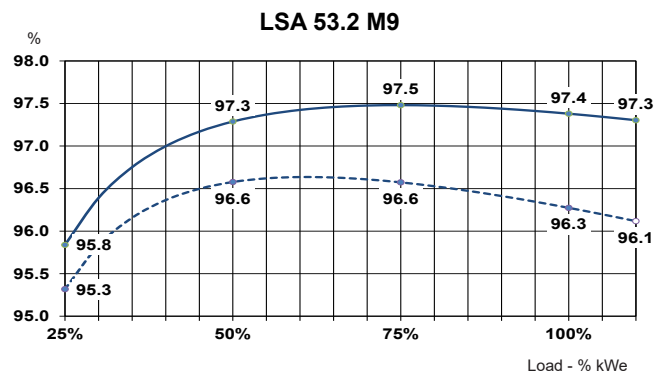
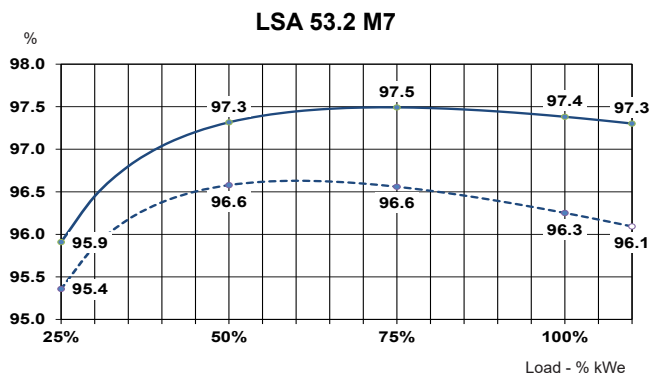
Ratings 50 Hz - 1500 R.P.M.

| 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 | 380V | 400V | 415V | 380V | 400V | 415V | 380V | 400V | 415V |
| LSA 53.2 M7 kVA | 2650 | 2650 | 2650 | 2417 | 2417 | 2417 | 2783 | 2783 | 2783 | 2915 | 2915 | 2915 |
| kW | 2120 | 2120 | 2120 | 1934 | 1934 | 1934 | 2226 | 2226 | 2226 | 2332 | 2332 | 2332 |
| LSA 53.2 M9 kVA | 3000 | 3000 | 3000 | 2736 | 2736 | 2736 | 3150 | 3150 | 3150 | 3300 | 3300 | 3300 |
| kW | 2400 | 2400 | 2400 | 2189 | 2189 | 2189 | 2520 | 2520 | 2520 | 2640 | 2640 | 2640 |
| LSA 53.2 M12 kVA | 3300 | 3300 | 3300 | 3010 | 3010 | 3010 | 3465 | 3465 | 3465 | 3630 | 3630 | 3630 |
| kW | 2640 | 2640 | 2640 | 2408 | 2408 | 2408 | 2772 | 2772 | 2772 | 2904 | 2904 | 2904 |

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 | 440V | 480V | | 440V | 480V | | 440V | 480V | | 440V | 480V | |
| LSA 53.2 M7 kVA | 2888 | 3150 | | 2634 | 2873 | | 3032 | 3308 | | 3176 | 3465 | |
| kW | 2310 | 2520 | | 2107 | 2298 | | 2426 | 2646 | | 2541 | 2772 | |
| LSA 53.2 M9 kVA | 3300 | 3600 | | 3010 | 3283 | | 3465 | 3780 | | 3630 | 3960 | |
| kW | 2640 | 2880 | | 2408 | 2626 | | 2772 | 3024 | | 2904 | 3168 | |
| LSA 53.2 M12 kVA | 3630 | 3900 | | 3311 | 3557 | | 3812 | 4095 | | 3993 | 4290 | |
| kW | 2904 | 3120 | | 2649 | 2846 | | 3050 | 3276 | | 3194 | 3432 | |

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



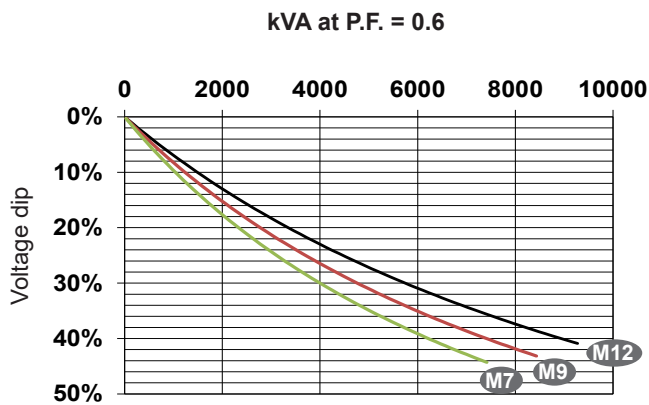
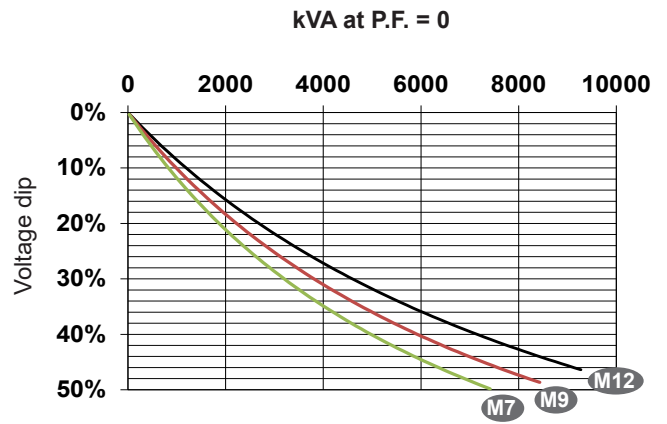
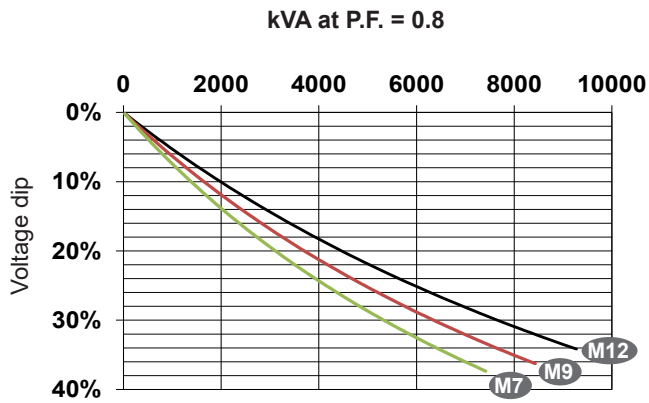
Reactances (%). Time constants (ms) - Class H / 400V

| | M7 | M9 | M12 |
|--|-------|-------|-------|
| Kcc Short-circuit ratio | 0.35 | 0.36 | 0.39 |
| Xd Direct-axis synchronous reactance unsaturated | 354 | 343 | 314 |
| Xq Quadrature-axis synchronous reactance unsaturated | 181 | 175 | 160 |
| T'do No-load transient time constant | 3.21 | 3.38 | 3.58 |
| .X'd Direct-axis transient reactance saturated | 33.4 | 31.9 | 29.1 |
| T'd Short-circuit transient time constant | 0.356 | 0.370 | 0.39 |
| X''d Direct-axis subtransient reactance saturated | 19.4 | 18.3 | 16.6 |
| T''d Subtransient time constant | 0.024 | 0.023 | 0.023 |
| X''q Quadrature-axis subtransient reactance saturated | 20.2 | 19.1 | 17.3 |
| X0 Zero sequence reactance | 4.6 | 4.3 | 3.9 |
| X2 Negative sequence reactance saturated | 19.8 | 18.7 | 17.0 |
| Ta Armature time constant | 0.045 | 0.044 | 0.044 |

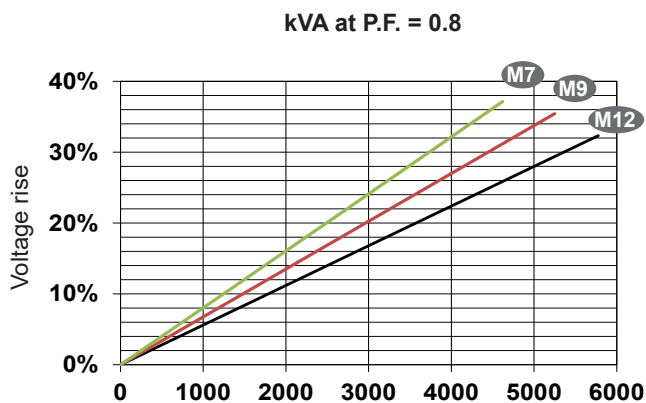
Other class H / 400V data

| | M7 | M9 | M12 |
|--|-----|-----|-----|
| io (A) No-load excitation current | 1.3 | 1.3 | 1.3 |
| ic (A) On-load excitation current | 5.3 | 5.2 | 4.9 |
| uc (V) On-load excitation voltage | 63 | 61 | 58 |
| kW No-load losses | 21 | 24 | 29 |
| kW Heat dissipation | 90 | 101 | 110 |

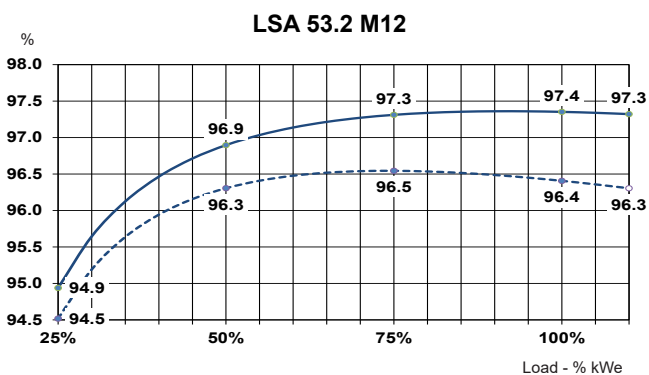
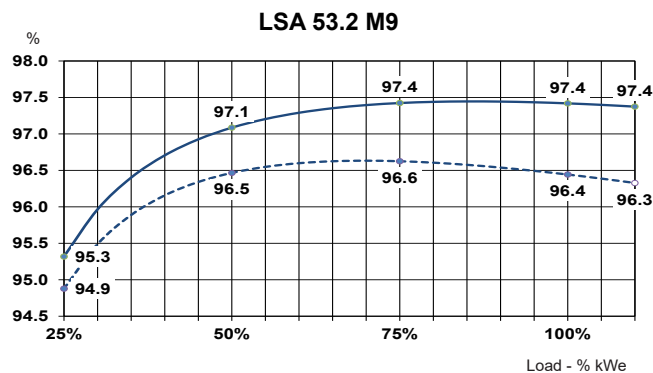
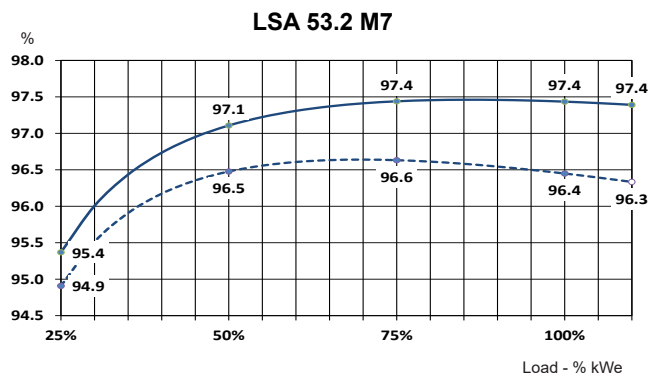
Transient voltage variation at load inrush: 400V - 50 Hz



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



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



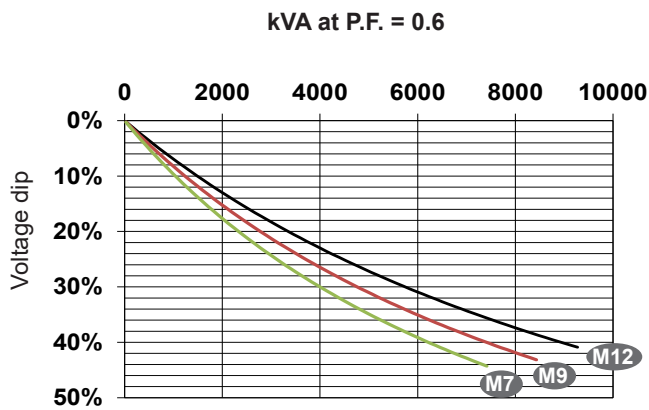
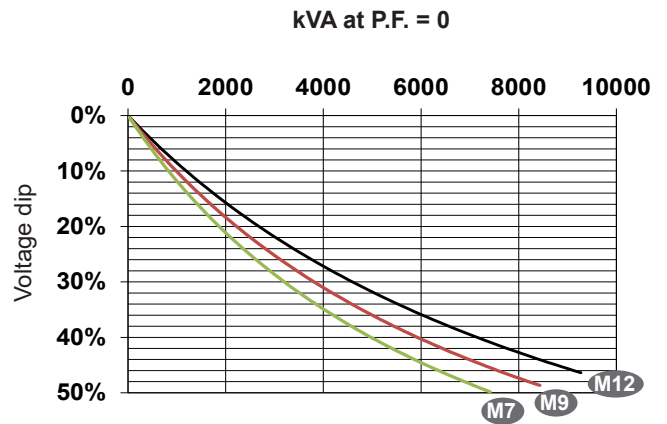
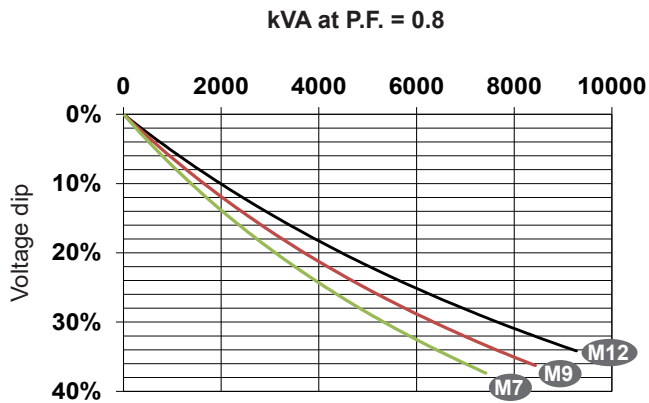
Reactances (%). Time constants (ms) - Class H / 480V

| | M7 | M9 | M12 |
|--|-------|-------|-------|
| Kcc Short-circuit ratio | 0.35 | 0.36 | 0.40 |
| Xd Direct-axis synchronous reactance unsaturated | 351 | 343 | 310 |
| Xq Quadrature-axis synchronous reactance unsaturated | 179 | 175 | 158 |
| T'do No-load transient time constant | 3.21 | 3.38 | 3.58 |
| X'd Direct-axis transient reactance saturated | 33.1 | 31.9 | 28.6 |
| T'd Short-circuit transient time constant | 0.356 | 0.370 | 0.388 |
| X''d Direct-axis subtransient reactance saturated | 19.2 | 18.3 | 16.3 |
| T''d Subtransient time constant | 0.024 | 0.023 | 0.023 |
| X''q Quadrature-axis subtransient reactance saturated | 20.1 | 19.1 | 17.1 |
| X0 Zero sequence reactance | 4.5 | 4.3 | 3.8 |
| X2 Negative sequence reactance saturated | 19.6 | 18.7 | 16.7 |
| Ta Armature time constant | 0.043 | 0.042 | 0.042 |

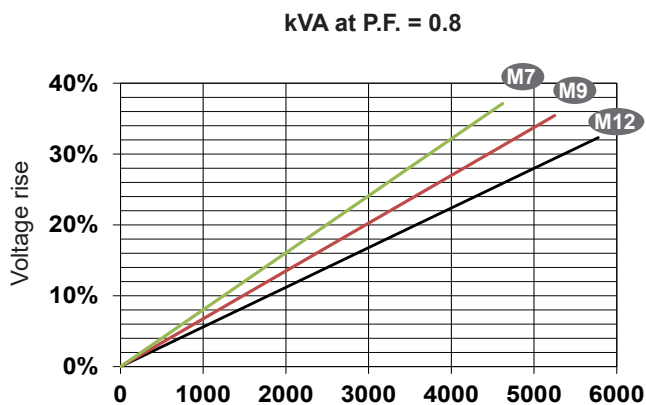
Other class H / 480V data

| | | | |
|--|-----|-----|-----|
| io (A) No-load excitation current | 1.2 | 1.3 | 1.3 |
| ic (A) On-load excitation current | 5.2 | 5.1 | 4.8 |
| uc (V) On-load excitation voltage | 61 | 60 | 56 |
| kW No-load losses | 29 | 24 | 39 |
| kW Heat dissipation | 98 | 112 | 123 |

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

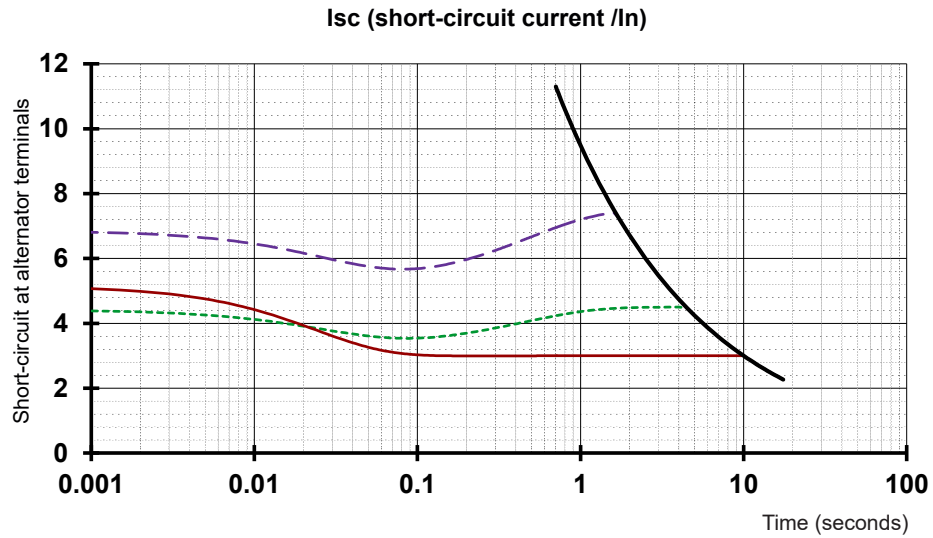


Transient voltage variation at load rejection: 480V - 60 Hz

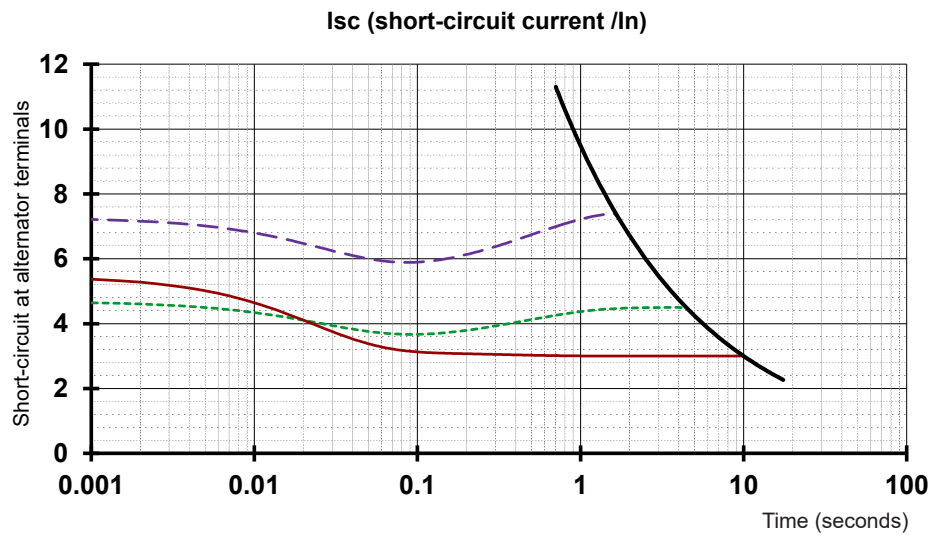


Short-circuit curves at rated speed (star connection Y)

LSA 53.2 M7

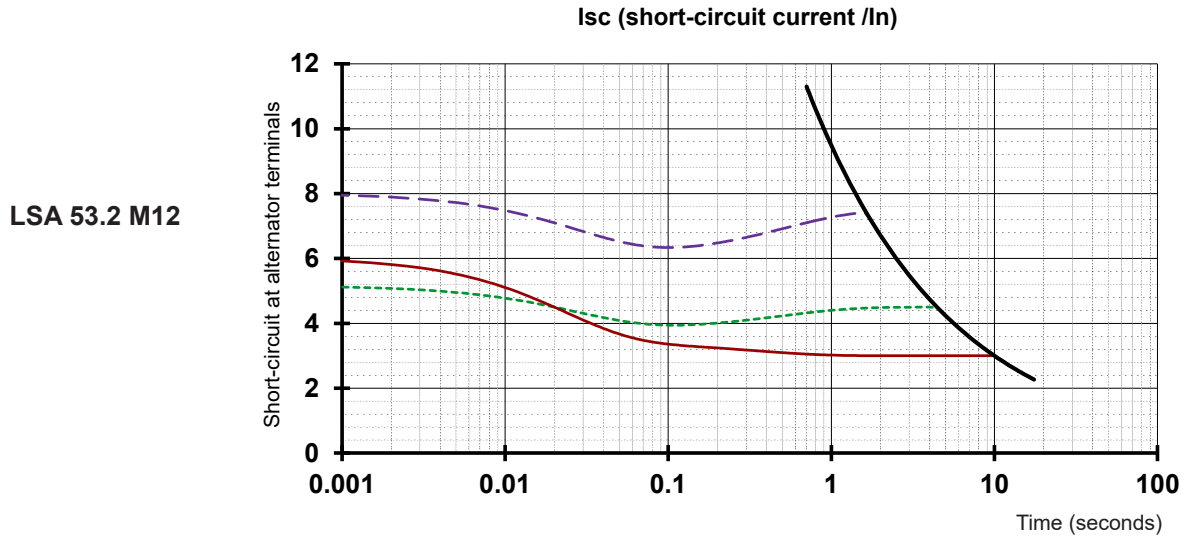


LSA 53.2 M9



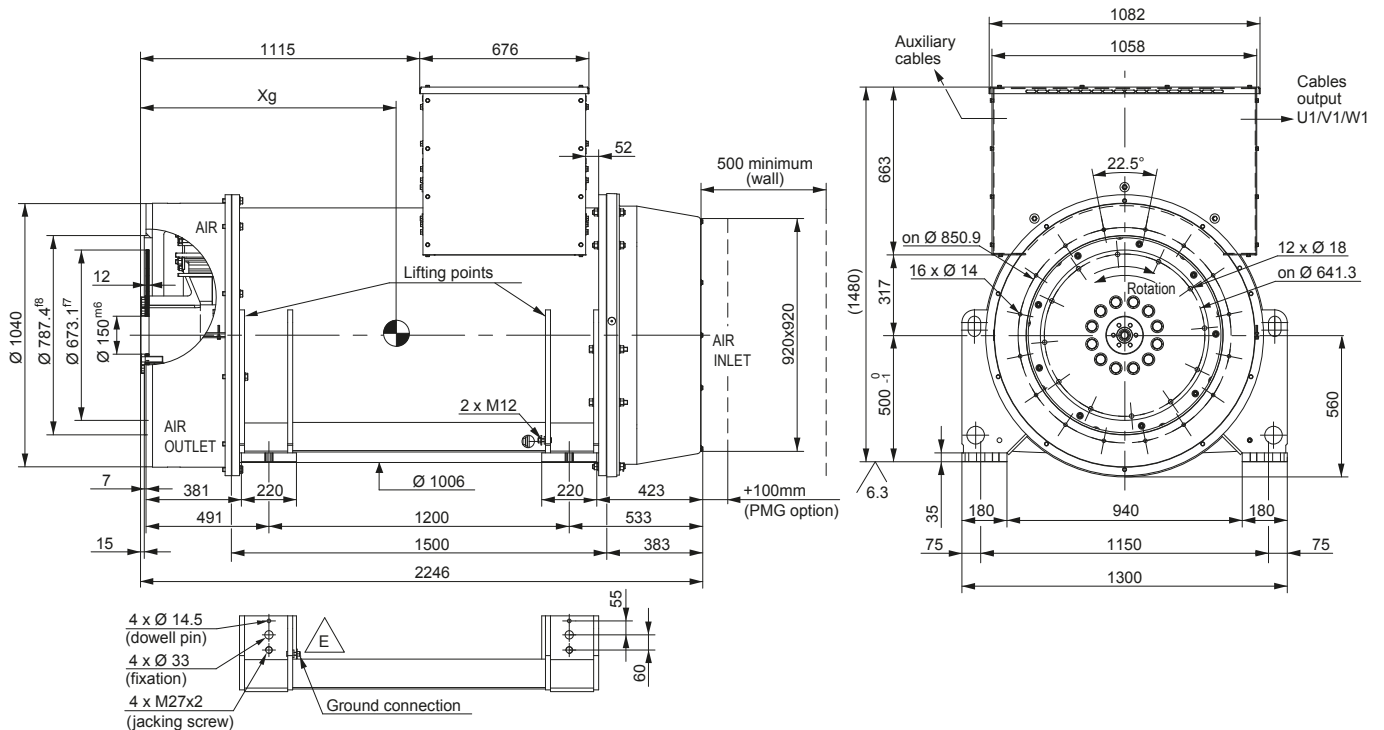
- Symmetrical phase to neutral short-circuit
- - - Symmetrical two-phase short-circuit
- Symmetrical three-phase short-circuit
- Thermal limit curve

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



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

Single bearing dimensions



| Dimensions (mm) and weight | | |
|----------------------------|------|-------------|
| Type | Xg | Weight (kg) |
| LSA 53.2 M7 | 942 | 5250 |
| LSA 53.2 M9 | 969 | 5700 |
| LSA 53.2 M12 | 1010 | 6300 |

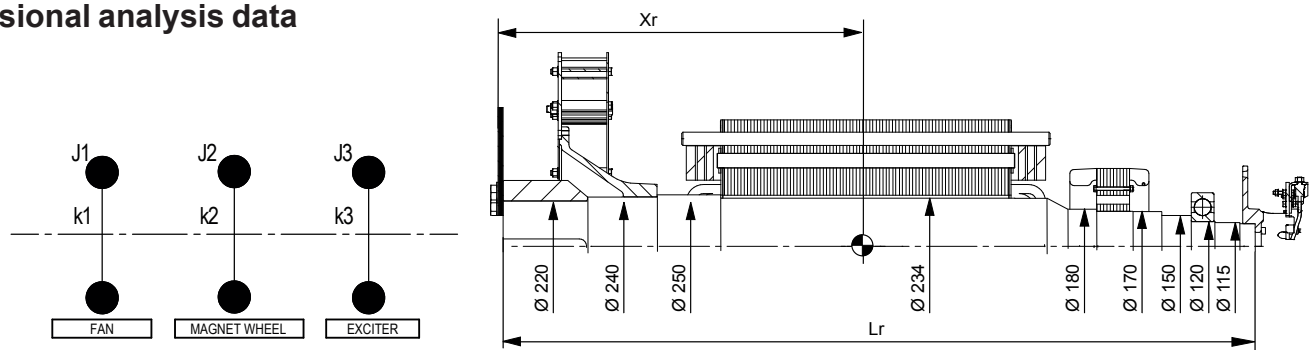
| Coupling | | |
|----------------------|---|----|
| Flange S.A.E. | 0 | 00 |
| Flex plate S.A.E. 21 | | X |
| Flex plate S.A.E. 18 | X | X |

3D drawing files available - Do not hesitate to contact us.

| Flange (mm) | | | | |
|-------------|-------|-------|-----|----|
| S.A.E. | N | M | XBG | S |
| 0 | 647.7 | 679.5 | 16 | 14 |
| 00 | 787.4 | 850.9 | 16 | 14 |

| 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

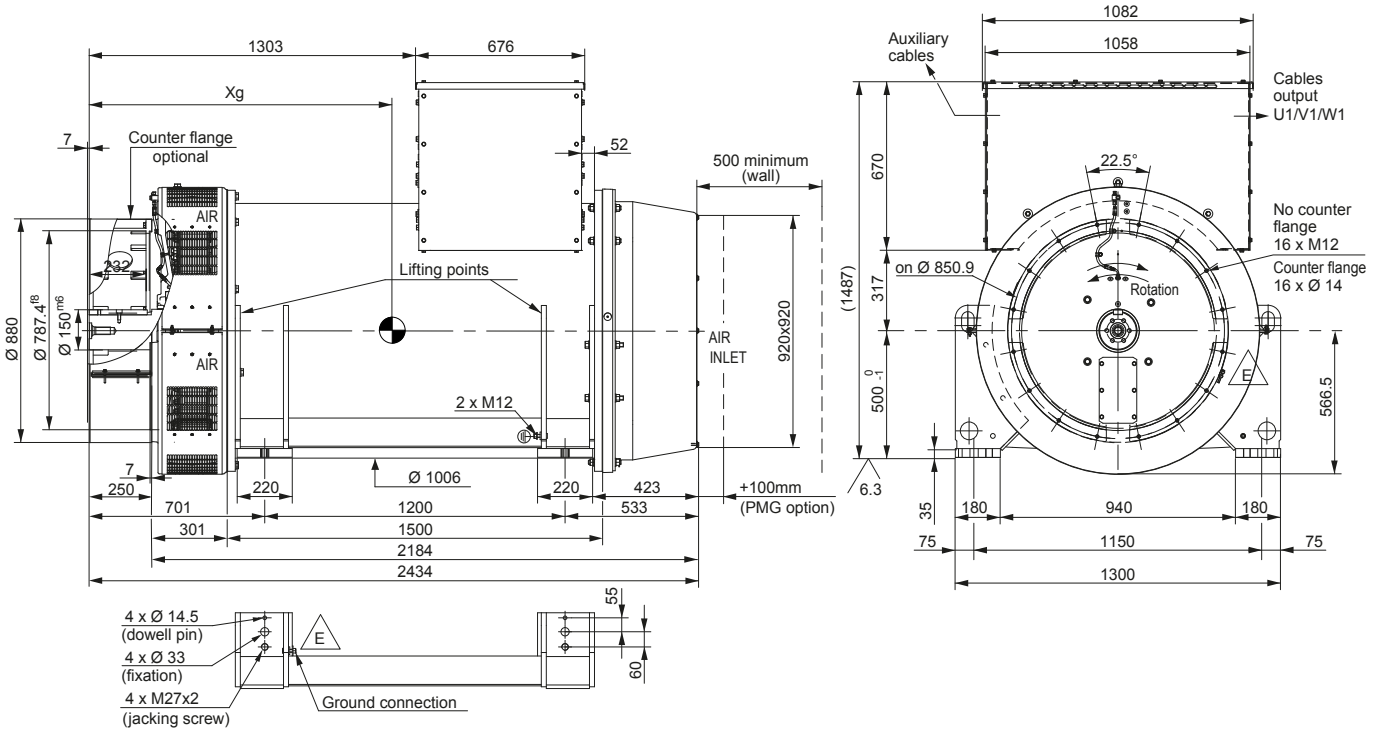


| Centre of gravity: Xr (mm), Rotor length: Lr (mm), Weight: M (kg) | | | |
|---|-----|------|------|
| Type | Xg | Lr | M |
| LSA 53.2 M7 | 841 | 2056 | 2024 |
| LSA 53.2 M9 | 874 | 2056 | 2187 |
| LSA 53.2 M12 | 924 | 2056 | 2415 |

| Torsional rigidity | | | | | |
|--------------------|-----------|-----------|----------------------|------|-----|
| [Nm/rad] | | | (kg.m ²) | | |
| k1 | k2 | k3 | J1 | J2 | J3 |
| 6.44 10E7 | 6.58 10E7 | 2.53 10E7 | 14.1 | 62.5 | 2.1 |
| 6.44 10E7 | 6.02 10E7 | 2.72 10E7 | 14.1 | 71.3 | 2.0 |
| 6.44 10E7 | 5.38 10E7 | 3.05 10E7 | 14.1 | 83.6 | 1.8 |

NOTE: Dimensions are for information only and may be subject to modifications. Contractual 2D drawings and 3D drawing files are available and can be downloaded from the site: www.leroy-somer.com/epg. The torsional analysis of the transmission is the responsibility of genset manufacturer.

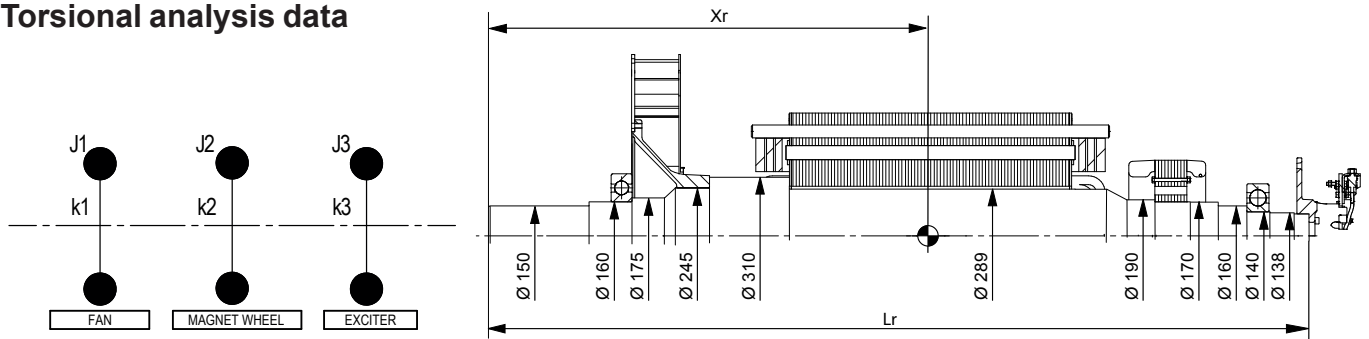
Two bearing dimensions



| Dimensions (mm) and weight | | |
|----------------------------|-------|-------------|
| Type | X_g | Weight (kg) |
| LSA 53.2 M7 | 1123 | 5300 |
| LSA 53.2 M9 | 1150 | 5750 |
| LSA 53.2 M12 | 1192 | 6400 |

3D drawing files available - Do not hesitate to contact us.

Torsional analysis data



Centre of gravity: X_r (mm), Rotor length: L_r (mm), Weight: M (kg)

| Type | X_r | L_r | M |
|--------------|-------|-------|------|
| LSA 53.2 M7 | 1072 | 2224 | 1906 |
| LSA 53.2 M9 | 1103 | 2224 | 2069 |
| LSA 53.2 M12 | 1152 | 2224 | 2297 |

Torsional rigidity

| [Nm/rad] | | | (kg.m ²) | | |
|-----------|-----------|-----------|----------------------|-------|-------|
| k_1 | k_2 | k_3 | J_1 | J_2 | J_3 |
| 1.94 10E7 | 6.58 10E7 | 2.53 10E7 | 10.8 | 62.5 | 2.1 |
| 1.94 10E7 | 6.02 10E7 | 2.72 10E7 | 10.8 | 71.3 | 2.0 |
| 1.94 10E7 | 5.38 10E7 | 3.05 10E7 | 10.8 | 83.6 | 1.8 |

NOTE: Dimensions are for information only and may be subject to modifications. Contractual 2D drawings and 3D drawing files are available and can be downloaded from the site: www.leroy-somer.com/epg. The torsional analysis of the transmission is the responsibility of genset manufacturer.

LEROY-SOMER[™]

www.leroy-somer.com/epg

[Linkedin.com/company/leroy-somer](https://www.linkedin.com/company/leroy-somer)
[Twitter.com/Leroy_Somer_en](https://twitter.com/Leroy_Somer_en)
[Facebook.com/LeroySomer.Nidec.en](https://www.facebook.com/LeroySomer.Nidec.en)
[YouTube.com/LeroySomerOfficiel](https://www.youtube.com/LeroySomerOfficiel)



Nidec
All for dreams

© Nidec 2020. The information contained in this brochure is for guidance only and does not form part of any contract. The accuracy cannot be guaranteed as Nidec have an ongoing process of development and reserve the right to change the specification of their products without notice.

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.