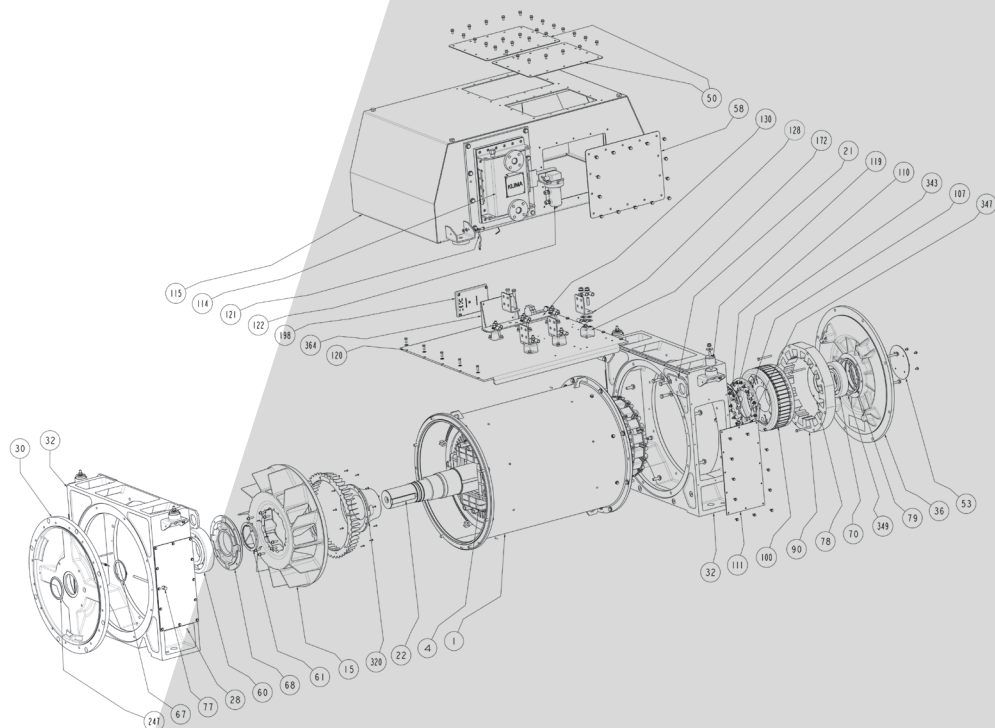




Power



LSA 49.3

Low Voltage Alternator
IC8 / CACW / TEWAC - 4 poles

Installation and maintenance

LEROY-SOMER™

LSA 49.3

Low Voltage Alternator - IC8 / CACW / TEWAC - 4 poles

**This manual concerns the alternator which you have just purchased.
We wish to draw your attention to the contents of this maintenance manual.**

SAFETY MEASURES

Before using your machine for the first time, it is important to read the whole of this installation and maintenance manual.

All necessary operations and interventions on this machine must be performed by a qualified technician.

Our technical support service will be pleased to provide any additional information you may require.

The various operations described in this manual are accompanied by recommendations or symbols to alert the user to potential risks of accidents. It is vital that you understand and take notice of the following warning symbols.

WARNING

Warning symbol for an operation capable of damaging or destroying the machine or surrounding equipment.



Warning symbol for general danger to personnel.



Warning symbol for electrical danger to personnel.

SAFETY INSTRUCTIONS

A set of self-adhesive stickers depicting the various warning symbols is included with this maintenance manual. They should be positioned as shown in the drawing below once the machine has been fully installed.

WARNING

The alternators must not be put into service until the machines in which they are to be incorporated have been declared compliant with EC Directives plus any other directives that may be applicable.

This manual is to be given to the end user.

The range of electric alternators and their derivatives, manufactured by us or on our behalf, comply with the technical requirements of the customs Union directives.

The alternator is a sub-assembly delivered without a system of protection against short-circuits. The protection must be provided by the circuit-breaker of the generator, sized to interrupt the fault current.

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Share Capital: 32,239,235 €, RCS Angoulême 338 567 258.

We reserve the right to modify the characteristics of this product at any time in order to incorporate the latest technological developments. The information contained in this document may therefore be changed without notice.

This document may not be reproduced in any form without prior authorization.

All brands and models have been registered and patents applied for.

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EC Declaration

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1 - RECEIPT

1.1 - Standards and safety measures

Our alternators comply with most international standards.

See the EC Declaration of Incorporation on the last page.

1.2 - Inspection

On receipt of your alternator, check that it has not suffered any damage in transit. If there are obvious signs of knocks, contact the transporter (you may be able to claim on their insurance).

1.3 - Identification

The alternator is identified by means of a nameplate fixed on the machine (see drawing).

Make sure that the nameplate on the machine conforms to your order.

So that you can identify your alternator quickly and accurately, we suggest you fill in its specifications on the nameplate below.

1.4 - Storage

Prior to commissioning, machines should be stored away from humidity (< 90%). After a long period of storage, check the machine insulation (see sections 3.2 and 4.6).

To prevent the bearings from becoming marked, do not store in an environment with significant vibration.

For prolonged storage, please follow the recommendations in the storage manual ref 4954 available on our website:

www.nidecpower.com/downloads

1.5 - Applications

This alternator is mainly designed to produce electricity in the context of applications involving the use of generators.

1.6 - Usage restrictions

Use of the machine is restricted to operating conditions (environment, speed, voltage, power, etc) compatible with the characteristics indicated on the nameplate.

Nidec **LEROY-SOMER™**

Model	LSA		
S/N	Date		
Enclosure	Protection		
Th. Class	Altitude		
Weight	PF		
AVR	Excitation		
Excitation values	No Load	Full Load	
DE bearing			
NDE bearing			

Frequency	Hz						
Speed	min ⁻¹						
Voltage	V						
Phase							
Connection							
Cont. BR 40°C	kVA						
	kW						
	A						
Stand by PR 27°C	kVA						
	kW						
	A						



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LSA 000-1-148 a



IEC 60034 - 1 & 5
ISO 8528 - 3
NEMA MG 1 32 & 33

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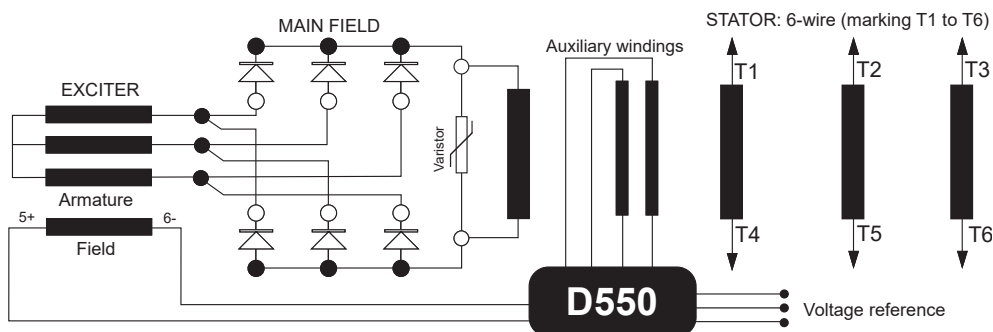
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2 - TECHNICAL CHARACTERISTICS

2.1 - Electrical characteristics

This alternator is a machine without sliprings or revolving armature brushes, wound as “2/3 pitch”, 6-wire, with class H insulation and a field excitation system available in AREP version (see diagram and AVR manual).

• AREP three-phase 6-wire



2.2 - Mechanical characteristics

- Steel frame
- Cast iron endshields and bracket body
- Regreasable ball bearings
- Mounting arrangement: two-bearing with SAE flange and standard cylindrical shaft extension
- Degree of protection: IP55
- Double tube water exchanger with leak detector

- Bearing temperature sensors
- Rotor earth brush
- Insulated ball bearing
- Parallel operation CT
- Protection or measurement CT (consult us)
- Space heaters



Warning : the supply is still present when the machine has stopped.

2.3 - Options

- R791 interference suppression
- Stator temperature sensors PTC or PT100 (1 or 2 per phase)

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3 - INSTALLATION

Personnel undertaking the various operations indicated in this section must wear personal protective equipment appropriate for mechanical and electrical hazards.

3.1 - Assembly



All mechanical handling operations must be undertaken using suitable equipment and the machine must be horizontal. Check how much the machine weighs before choosing the lifting tool. During this operation, do not allow anyone to stand under the load.

• Handling

The generously-sized lifting eyes are for handling the alternator only. They must not be used to lift the genset. The choice of lifting hooks or handles should be determined by the shape of the lifting eyes. Choose a lifting system which respects the integrity and the environment of the machine.

• Double-bearing coupling

- Semi-flexible coupling

Careful alignment of the machines is recommended, checking that the lack of concentricity and parallelism of both parts of the coupling do not exceed 0.1 mm.

This alternator has been balanced with a 1/2 key.

• Location

The machine must only be used in the environmental conditions which are defined when ordering.



Warning: if the ambient temperature is above 40°C and/or if the water temperature is above 30°C, a power derating is necessary (contact us).

3.2 - Checks prior to first use

• Electrical checks

Disconnect the three phases at the generator terminals.

WARNING

All accessories must be disconnected (AVR, EMC filter, etc.). Refer to the electrical schematics to identify the accessories to disconnect.

The measurement has to be taken between one phase and the earth. The reading is taken after 1 minute of test.

	Test voltage (VDC)	Criteria (MΩ ; 40°C)
Stator: $U \leq 1$ kV	500	5
Rotor	500	5
Exciter (stator and rotor)	500	5
Excitation auxiliary windings (AREP)	250	5
PMG (stator)	100	5
Heating element	500	5
Temperature sensors	500	5

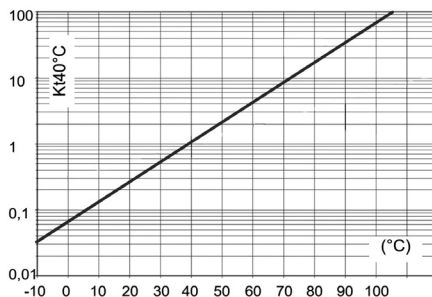
IEEE 43 recommendations

If the insulation resistance is not measured with a tested element à 40°C, a corrective factor has to be used.

$$R_m 40^\circ\text{C} = R_t \times K_{t40}$$

R_t Measured insulation resistance

K_{t40} Corrective factor



There is a possible method for restoring the above minimum values: dry out the machine for 24 hours in a drying oven at a temperature of 110 °C (without the regulator).

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Note : Prolonged standstill

In order to avoid these problems, we recommend the use of space heaters, as well as turning over the machine from time to time. Space heaters are only really effective if they are working continuously while the machine is stopped.

WARNING

Ensure that the alternator has the degree of protection matching the defined environmental conditions.

• Mechanical checks

Before starting the machine for the first time, check that:

- all fixing dismantled bolts are tight and that there are no leaks on the water inlet and outlet,
- the length and tightening torque of the added bolts are correct,
- the cooling water must circulate freely,
- the protective grilles and housing are correctly in place,
- the standard direction of rotation is clockwise as seen from the shaft end (phase rotation in order 1 - 2 - 3).

For anti-clockwise rotation, swap 2 and 3.

- the winding connection corresponds to the site operating voltage (see section 3.3).

3.3 - Terminal connection diagram



Any intervention on the alternator terminals during reconnection or checks should be performed with the machine stopped. In no case should the internal connections in the terminal box be subjected to stresses due to cables connected by the user.

• Voltage reconnections

Phase - Code	3-ph - D
Connections	
	star
Number of wires	6

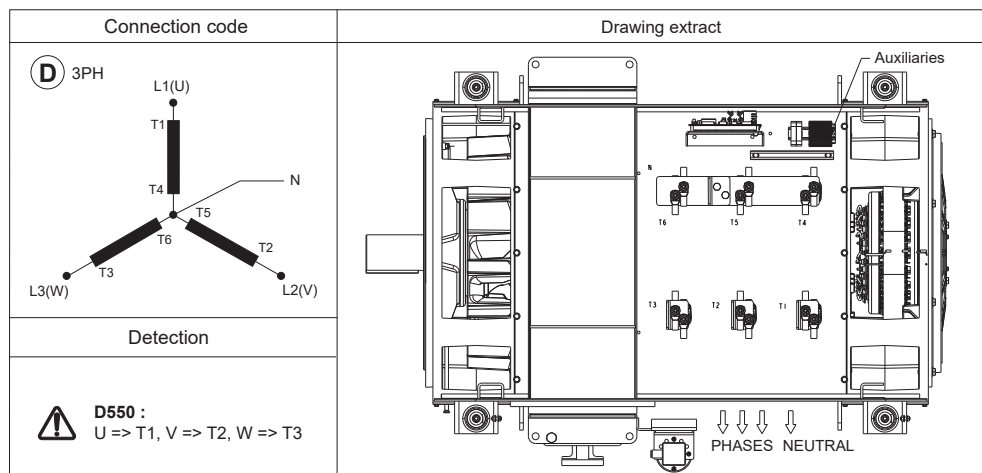
50 Hz - 1500 rpm	
Winding 6 standard	380 - 415 V
Winding 6 standard	440 V
Winding 7 specific	415 - 440 V
Winding 9 specific	500 - 525 V
Winding 22 or 23 specific	550 - 600 V
Winding 10 or 52 specific	660 - 690 V

60 Hz - 1800 rpm	
Winding 6 standard	380 - 480 V
Winding 8 specific	380 - 416 V
Winding 9 specific	600 V
Winding 22 or 23 specific	660 - 690 V

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• AREP three-phase 6-wire



• Connection checks



Electrical installations must comply with the current legislation in force in the country of use.

Check that:

- The residual circuit-breaker conforms to legislation on protection of personnel, in force in the country of use, and has been correctly installed on the alternator power output as close as possible to the alternator. (In this case, disconnect the wire of the interference suppression module linking the neutral).
- Any protection devices in place have not been tripped.
- If there is an external AVR, the connections between the alternator and the cabinet are made in accordance with the connection diagram.
- There is no short-circuit phase-phase or phase-neutral between the alternator output terminals and the generator set control cabinet (part of the circuit not protected by circuitbreakers or relays in the cabinet).

- The machine should be connected with the busbar separating the terminals as shown in the terminal connection diagram.



- The alternator earth terminal inside the terminal box is connected to the electrical earth circuit
- The earth terminal is connected to the frame.

The connections inside the terminal box must never be subjected to stress due to cables connected by the user.



Diameter	M6	M8	M10	M12
Torque	4 Nm	10 Nm	20 Nm	35 Nm
Tolerance	± 15%			

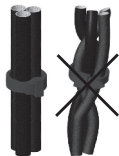
Important points for all reconnection operations:

- Use polyamide plastic clamps 105°C minimum, 550 N minimum.
- Group the cables: three maximum.
- Do not cross cables if possible.

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- Leave enough space to allow cooling.



3.4 - Commissioning



The machine can only be started up and used if the installation is in accordance with the regulations and instructions defined in this manual.

The machine is tested and set up at the factory. When first used with no load, make sure that the drive speed is correct and stable (see the nameplate). With the regreasable bearing option, we recommend greasing the bearings at the time of commissioning (see section 4.4).

On application of the load, the machine should achieve its rated speed and voltage; however, in the event of abnormal operation, the machine setting can be altered (follow the adjustment procedure in section 3.5). If the machine still operates incorrectly, the cause of the malfunction must be located (see section 4.6).

3.5 - Setting up



The various adjustments during tests must be made by a qualified engineer.

Ensure that the drive speed specified on the nameplate is reached before commencing adjustment.

After operational testing, replace all access panels or covers.

The AVR is used to make any adjustments to the machine.

4 - SERVICING - MAINTENANCE

4.1 - Safety measures

Servicing or troubleshooting must be carried out strictly in accordance with instructions so as to avoid the risk of accidents and to maintain the machine in its original state.



All such operations performed on the alternator should be undertaken by personnel trained in the commissioning, servicing and maintenance of electrical and mechanical components, who must wear personal protective equipment appropriate for mechanical and electrical hazards.

Before any intervention on the machine, ensure that it cannot be started by a manual or automatic system and that you have understood the operating principles of the system.



Warning : During and after running, the alternator will reach temperatures hot enough to cause injury, such as burns.

4.2 - Routine maintenance

• Checks after start-up

After approximately 20 hours of operation, check that all fixing bolts on the machine are still tight, plus the general state of the machine and the various electrical connections in the installation.

• Electrical servicing

Commercially-available volatile degreasing agents can be used.

WARNING

Do not use: trichlorethylene, perchlorethylene, trichloroethane or any alkaline products.

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These operations must be performed at a cleaning station, equipped with a vacuum system that collects and flushes out the products used.

The insulating components and the impregnation system are not at risk of damage from solvents. Avoid letting the cleaning product run into the slots.

Apply the product with a brush, sponging frequently to avoid accumulation in the housing. Dry the winding with a dry cloth. Let any traces evaporate before reassembling the machine.

• Mechanical servicing

WARNING

Cleaning the machine using water or a highpressure washer is strictly prohibited. Any problems arising from such treatment are not covered by our warranty.

Check regularly that no liquid is leaking from the cooling circuit.

Degreasing: Use a brush and detergent (suitable for paintwork).

Dusting: Use an air gun.

If the machine is fitted with air inlet and outlet filters, the maintenance personnel should clean them routinely at regular intervals. In the case of dry dust, the filter can be cleaned using compressed air and/or replaced if it is clogged.

After cleaning the alternator, it is essential to check the winding insulation (see sections 3.2 and 4.6).

4.3 - Air/water heat exchanger

• Description of the cooler

The purpose of the cooler, is to remove the machine heat losses (mechanical, ohmic, ...). The exchanger is located on the top of the machine.

Normal operation:

The air is pulsed by a fan fixed to the synchronous machine shaft.

The air goes through the exchanger, rendering its calories.

AIR / WATER double tube exchanger:

The double-tube technique keeps the cooling circuit from being affected by possible water leakage.

The double tube provides a high safety level.

In case of leakage, the water goes from the inside of the internal tube to the coaxial space between the two tubes.

The water is drained axially to a leakage chamber where it may activate a sensor.

An exchanger is comprised of a fin-tube block containing:

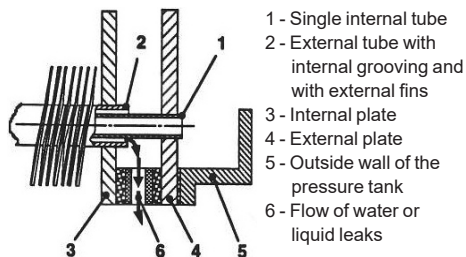
- a steel frame,
- a fin-tube block crimped mechanically to the tubes.

The tube bundle is roll-expanded in the end plates (parts 3 and 4).

The water distribution in the tubes is provided by two removable water boxes.

A water box is equipped with collars for fitting the inlet and outlet lines.

Neoprene seals ensure the watertightness between the water boxes and the end plates.



• Maintenance

The frequency of cleaning operations depends essentially on the purity of the water used.

We recommend a minimum of one inspection per year:

Stop the machine.

Cut off the power supply by isolating the inlet and outlet lines, and drain the water.

Disconnect the leak sensor (option with double-tube cooler), and make sure that there are no leaks.

Remove the water boxes on each side of the machine.

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Rinse and brush each water box.

Note: do not use a hard wire brush as this will remove the protective oxidation layer which has formed on the surfaces of the water boxes.

Clean each tube with a metal scraper ; rinse in soft water.

Keep the leakage chamber dry (double-tube water-cooler only).

• Leak detection for a double-tube exchanger

If a leak is detected, it is necessary to ascertain its origin immediately and repair it. Remove the two water boxes, apply a slight positive pressure in the leakage chamber, thus between the two tubes (only concerns the double-tube coolers).

If a tube is damaged: plug it at BOTH ends. Use a tapered plug.

The plug should preferably be made of salt-water resistant aluminium bronze or of a synthetic material.

• Servicing the water-cooler

Cooler removal:

The cooler unit is slid into the caisson.

It is possible to remove the cooler from the caisson without removing the water boxes.

The cooler is fastened to the caisson via a series of screws on the water box.

Remove the supply and return pipes.

Provide two supports to hold the cooler when it comes out of its housing.

Remove the cooler using slings that can be attached to the connecting flanges.

Cooler re-assembly:

Carry out the operations of the "Cooler removal" chapter in the reverse order.

Be careful to push the cooler completely into its housing before tightening the fastening screws of the cooler to the caisson.

• Water-cooler operating condition

WARNING

Water supply must be effective as soon as the generator is rotating until the complete shaft line stop.

Water supply must be stopped as soon as the generator is stopped to avoid importing condensation into the generator.

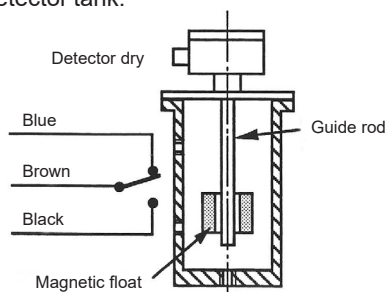
Condensation trouble may appear when using too cold water. Condensation trouble can be managed by the help of psychrometric diagram (Mollier diagram).

Water thermostatic valve monitored by the generator air temperature to regulate the water flow can help to fix the problem.

• Cooler protection devices (depending on option)

Leak detection (float system):

A magnetic float activates a switch located in the guide rod when water enters the detector tank.



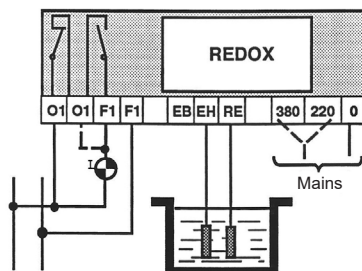
Leak detection (electrode system):

The REDOX 69 system measures the apparent resistance of the fluid whose leakage is to be checked.

By apparent resistance is meant the resistance between the electrodes of the system when they are immersed in their receptacle.

The current which circulates is used to activate a relay.

Contact	Electrodes submerged	Electrodes dry Relay not excited
01-01	open	closed
F1-F1	closed	open



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4.4 - Bearings

Regreasable bearings	Regreasing interval: 4000 hours in operation or every 6 months Amount of grease: DE and NDE bearing: 60 gr
Replacement of regreasable bearings	Amount of grease: - DE bearing: 480 gr - NDE bearing: 300 gr
Standard grease	LITHIUM - standard - NLGI 3
Grease used in the factory	ESSO - Unirex N3



It is imperative to lubricate the alternator during operation and on first use.
Front and rear bearing should be greased at the same time.

In case of dusty environment or high ambient temperature (> 40°C), relubrication interval must be divided by two. Before using another grease, check for compatibility with the original one.

4.5 - Mechanical defects

Fault		Action/Cause
Bearing	Excessive overheating of one or both bearings (bearing temperature 80°C above the ambient temperature)	- If the bearing has turned blue or if the grease has turned black, change the bearing - Bearing not fully locked (abnormal play in the bearing cage) - End shields incorrectly aligned
Abnormal temperature	Excessive overheating of alternator frame (more than 40° C above the ambient temperature)	- Air flow (inlet-outlet) partially clogged or hot air is being recycled from the alternator or engine - Alternator operating at too high a voltage (>105% of Un on load) - Alternator overloaded
Vibrations	Too much vibration	- Misalignment (coupling) - Defective mounting or play in coupling - Rotor balancing fault (Engine - Alternator)
	Excessive vibration and humming noise coming from the machine	- Phase imbalance - Stator short-circuit
Abnormal noise	Alternator damaged by a significant impact, followed by humming and vibration	- System short-circuit - Misparalleling Possible consequences - Broken or damaged coupling - Broken or bent shaft end - Shifting and short-circuit of main field - Fan fractured or coming loose on shaft - Irreparable damage to rotating diodes/AVR, surge suppressor

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4.6 - Electrical faults

Fault	Action	Effect	Check/Cause
No voltage at no load on start-up	Connect a new battery of 4 to 12 volts to terminals E- and E+, respecting the polarity, for 2 to 3 seconds	The alternator builds up and its voltage is still correct when the battery is removed	- Lack of residual magnetism
		The alternator builds up but its voltage does not reach the rated value when the battery is removed	- Check the connection of the voltage reference to the AVR - Faulty diodes - Armature short-circuit
		The alternator builds up but its voltage disappears when the battery is removed	- Faulty AVR - Field windings open circuit (check winding) - Revolving field coil open circuit (check the resistance)
Voltage too low	Check the drive speed	Correct speed	Check the AVR connections (AVR may be faulty) - Field windings short-circuited - Rotating diodes burnt out - Revolving field coil short-circuited (check the resistance)
		Speed too low	Increase the drive speed (do not touch the AVR voltage setting before running at the correct speed)
Voltage too high	Adjust AVR voltage potentiometer	Adjustment ineffective	- Faulty AVR - 1 faulty diode
Voltage oscillations	Adjust AVR stability potentiometer		- Check the speed : possibility of cyclic irregularity - Loose connections - Faulty AVR - Speed too low when on load (or LAM set too high)
Voltage correct at no load and too low when on load	Run at no load and check the voltage between E+ and E- on the AVR	Voltage between E+ and E- AREP < 10V	- Check the speed (or LAM set too high)
		Voltage between E+ and E- AREP > 15V	- Faulty rotating diodes - Short-circuit in the revolving field coil (check the resistance) - Faulty exciter armature (check the resistance)
Voltage disappears during operation	Check the AVR, the surge suppressor, the rotating diodes, and replace any defective components	The voltage does not return to the rated value	- Exciter winding open circuit - Faulty exciter armature - Faulty AVR - Revolving field coil open circuit or short-circuited

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• Checking the winding

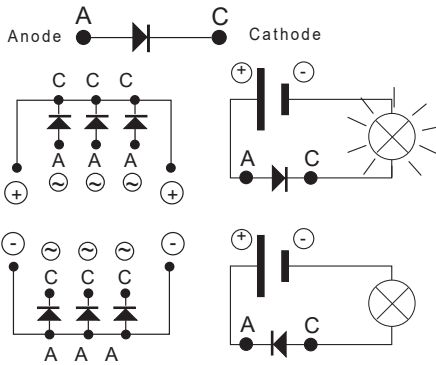
You can check the winding insulation by performing a high voltage test. In this case, you must disconnect all AVR wires.

WARNING

Damage caused to the AVR in such conditions is not covered by our warranty.

• Checking the diode bridge

A diode in good working order should allow the current to flow only in the anode-to-cathode direction.



• Checking the windings and rotating diodes using separate excitation



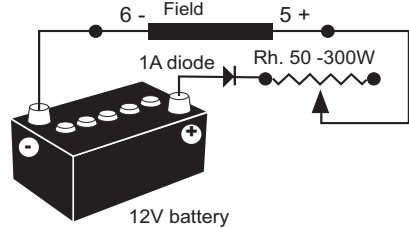
During this procedure, make sure that the alternator is disconnected from any external load and inspect the terminal box to check that the connections are fully tightened.

1) Stop the unit, disconnect and isolate the AVR wires.

2) There are two ways of creating an assembly with separate excitation.

Assembly A: Connect a 12 V battery in series with a rheostat of approximately 50 ohms - 300 W and a diode on both exciter field wires (5+) and (6-).

ASSEMBLY A



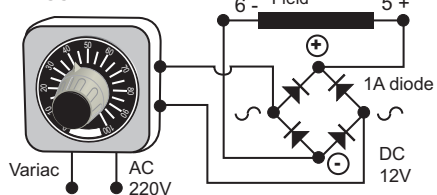
Assembly B: Connect a "Variac" variable power supply and a diode bridge on both exciter field wires (5+) and (6-).

Both these systems should have characteristics which are compatible with the field excitation power of the machine (see the nameplate).

3) Run the unit at its rated speed.

4) Gradually increase the exciter field current by adjusting the rheostat or the variac and measure the output voltages on L1 - L2 - L3, checking the excitation voltage and current at no load (see the machine nameplate or ask for the factory test report). When the output voltage is at its rated value and balanced within 1% for the rated excitation level, the machine is in good working order. The fault therefore comes from the AVR or its associated wiring (ie. sensing, auxiliary windings).

ASSEMBLY B



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4.7 - Dismantling, reassembly

WARNING

During the warranty period, this operation should only be carried out in an approved workshop or in our factory, otherwise the warranty may be invalidated.

Whilst being handled, the machine should remain horizontal (rotor not locked in position). Check how much the machine weighs before choosing the lifting method.

• Tools required

To fully dismantle the machine, we recommend using at least the tools listed below:

- 1 ratchet spanner + extension
- 1 torque wrench
- 1 set of flat spanners: 8 mm, 10 mm, 18 mm
- 1 socket set : 10, 13, 17, 18, 19, 24 mm,
- 1 puller (U35) / (U32/350)
- 1 hexagonal wrench 6 mm - 10 mm

• Screw tightening torque

See section 5.3.

• Draining the cooling circuit

The cooling circuit must be drained using a fluid recovery system.



Toxic risk

The coolant can contain up to 30% glycol-type antifreeze, which represents a risk to health.

• Access to diodes

- Remove the diodes access door (111).
- Disconnect the diodes.
- Check the diodes using an ohmmeter or a battery lamp.

If the diodes are faulty:

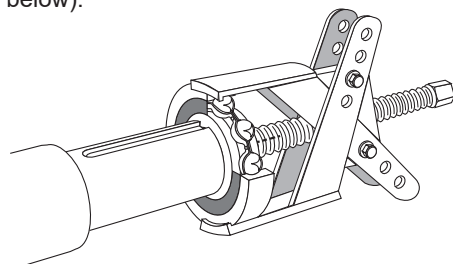
- Remove the surge suppressor (347) + copper Shunt.
- Remove the "H" nuts for mounting the diode bridges on the support.
- Change the crescents, respecting the polarity.

• Access to connections

Access is directly after removing the terminal box access doors (50).

• Replacing the NDE bearing

- Remove the diodes access door (111).
- Disconnect the exciter wires (+ and -).
- If bearing probe, unplug at the terminal, break the network circlips up to the bearing.
- Dismantle the sealing cap (53).
- Remove the inner bearing retainer screws (78).
- Remove the NDE bracket (36).
- Take out the antifriction bearing (70) using a puller with a central screw (see drawing below).



- Fit the new antifriction bearing onto the shaft after heating it by induction to approximately 80 °C.
- Mount the new preloading (wavy) washer (79) and the new "O" ring seal (349) in the NDE bracket (36).
- Proceed in reverse order to reassemble the other parts.

WARNING

When dismantling the brackets, you will need to change the antifriction bearings, the "O" ring seal, the preloading (wavy) washer, the adhesive paste, the lip seal and the rotor earth brush (option).

• Replacing the DE bearing

- If bearing probe, unplug at the terminal, break the network clips up to the bearing.
- Remove the DE lip seal (247).
- Remove the inner bearing retainer screws (68).
- Remove the DE bracket (30).

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- Remove the circlips (67).
- Take out the antifriction bearing (60) using a puller with a central screw.
- Replace the rotor earth brush (61) (option).
- Fit the new antifriction bearing after heating it by induction to approximately 80 °C.
- Mount the new DE lip seal (247) in the DE bracket (30).
- Proceed in reverse order to reassemble the other parts.

• Replacing the silentblocks

- Disconnect the earth connections (121).
- Unscrew the upper fixing "HM10" nuts of the silentblocks (119).
- Lift the cooling system assembly (114) (115).
- Unscrew the lower fixing "HM10" nuts of the silentblocks (119).
- Replace the silentblocks (119).
- Proceed in reverse order to reassembly.

WARNING

It is imperative to reconnect the earth connections (121) for personal safety.

- Recommendation: visual check of the silentblocks every 20,000 hours, change them if necessary.

• Dismantling the rotor assembly

- Remove the NDE bracket (36).
- Remove the DE bracket (30).
- Remove the diode access door (111).
- Remove the grease nipple tubes (77).
- Dismantle the cooling system assembly (114)(115).
- Dismantle the DE bracket body (32).
- Support the DE rotor (4) with a strap or with a support.
- Using a mallet gently hit the end of the shaft on the DE opposite side.
- Move the strap as the rotor moves in order to distribute the weight over it.

WARNING

When dismantling the rotor involves changing parts or rewinding, the rotor must be rebalanced.

• Reassembling the machine

- Place the "O" ring seal (349) and the preloading (wavy) washer (79) in the NDE bracket (36).
- Refit and fix the NDE bracket (36).
- Mount the rotor (4) in the stator (1) taking care not to knock the windings.
- Refit and fix the DE bracket (30).
- Refit the cooling system assembly (114) (115).
- Refit the front and rear grease nipple tubes (77) in the inner bearing retainers.
- Refit the diode access door (111).
- Fix the inner bearing retainer (68).
- Refit the DE lip seal (247).
- Refit and fix the cooling system assembly (114)(115).
- Refit the sealing cap (53).
- Reconnect the exciter wires and close the terminal box access doors (50)(58).

4.8 - Table of characteristics

Table of average values:

Alternator - 4 poles - 50 Hz - Standard winding No. 6S (6-wire) (400V for the excitation values).

The voltage and current values are given for no-load operation and operation at rated load with separate field excitation.

All values are given at $\pm 10\%$ and may be changed without prior notification (for exact values, consult the test report).

• Resistances at 20 °C (Ω)

Main armature

Type	Three-phase	
	Stator L/N	Rotor
L4	0.004	0.342
L6	0.003	0.379
L8	0.003	0.435
L9	0.002	0.472
L10/L11	0.002	0.485

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AREP auxiliary windings

Type	X1, X2	Z1, Z2
L4	0.249	0.297
L6	0.201	0.260
L8	0.205	0.268
L9	0.204	0.262
L10/L11	0.208	0.269

Exciter

	AREP	
Type	Exciter field	Exciter armature
L4 to L11	12.480	0.057

• Field excitation currents
400V / 50 Hz (A)

	Three-phase	
	AREP	
Type	No load	At rated load
L4	0.97	2.94
L6	1.08	2.80
L8	0.87	2.64
L9	0.99	2.61
L10	0.90	2.69
L11	0.90	3.00

For 60 Hz machines, the “i exc” values are approximately 5 to 10 % lower.

- Voltages of auxiliary windings
AREP (V)

Type	X1, X2	Z1, Z2
L4	110	10
L6 to L8	100	10
L9 to L11	120	15

- **Table of weights (kg)**

(maximum values given for information only)

Type	Total weight	Rotor
L4	1960	550
L6	2120	602
L8	2180	627
L9	2320	672
L10	2375	690
L11*	2440	690

* only with 35 kW exchanger

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5 - SPARE PARTS

5.1 - First maintenance parts

Here is the list of parts:

Two-bearing kit Standard	5364636
DE bearing RLT110OU030	
NDE bearing RLT090OU030	
NDE preloading (wavy) washer	
NDE O ring seal	
DE circlips	
DE lip seal	
NDE lip seal	
Two-bearing kit Option	5364637
DE bearing RLT110OU030	
Insulated NDE bearing RLT090RI003	
NDE preloading (wavy) washer	
NDE O ring seal	
DE circlips	
DE lip seal	
NDE lip seal	
Rotor earth brush	
Complete crescents equipped with diodes	5009583
Diodes: 6 direct + 6 reverse	
Surge suppressor	4691053
AVR D550	5157122
Set of 4 silentblocks	5371164

To ensure that our products operate correctly and safely, we recommend the use of original manufacturer spare parts.

In the event of failure to comply with this advice, the manufacturer cannot be held responsible for any damage.



After operational testing, it is essential to replace all access panels or covers.

5.2 - Technical support service

Our technical support service will be pleased to provide any additional information you may require.

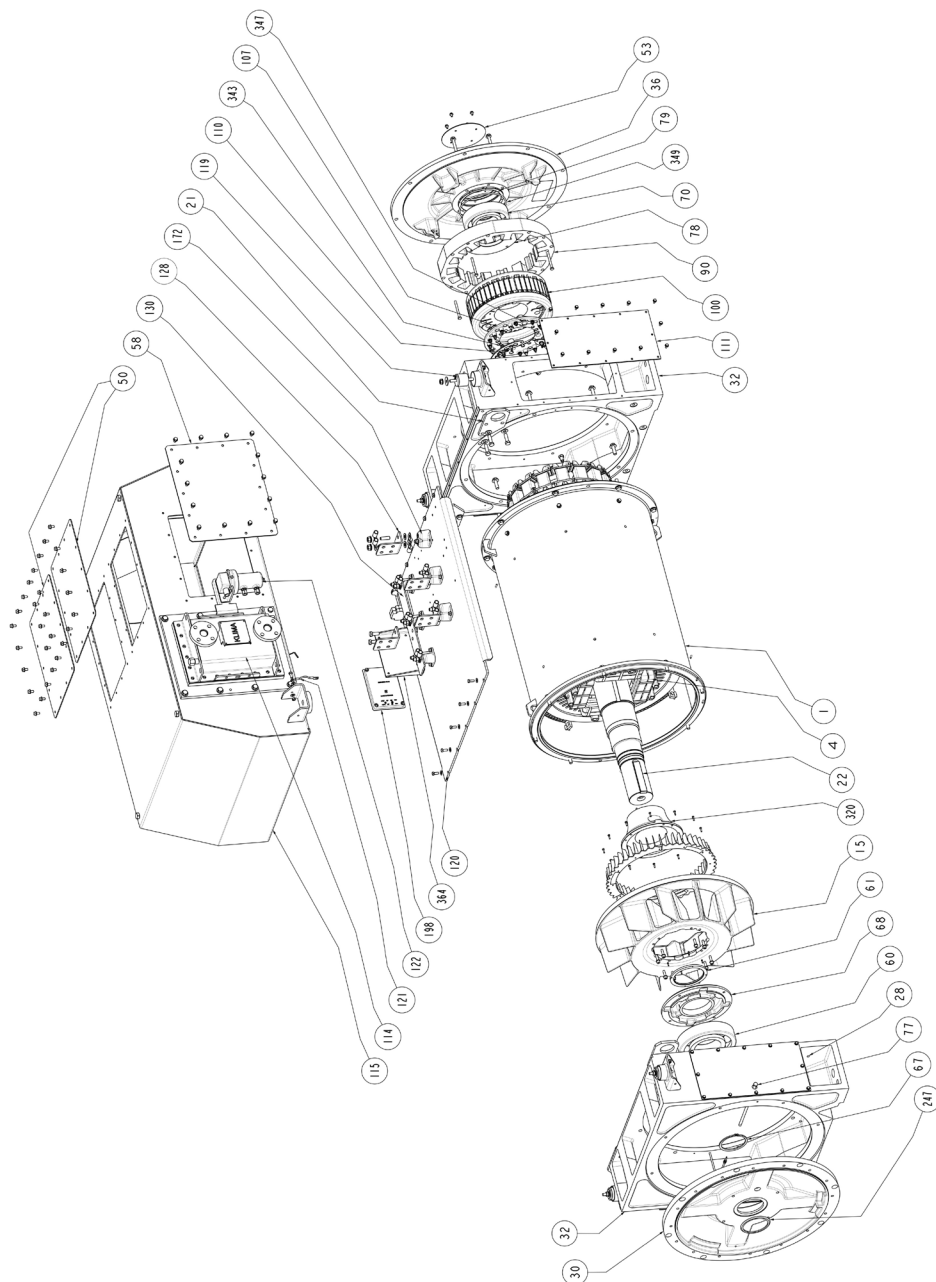
For all spare parts orders or technical support requests, send your request to service.epg@leroy-somer.com or your nearest contact, whom you will find at www.lrsom.co/support indicating the complete type of machine, its number and the information indicated on the nameplate.

Part numbers should be identified from the exploded views and their description from the parts list.

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5.3 - Exploded view, parts list and tightening torque



Nidec Power	Installation and maintenance	6183 en - 2025.04 / b
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Ref.	Qty	Description	Screw Ø	Torque N.m	Ref.	Qty	Description	Screw Ø	Torque N.m
1	1	Stator assembly	-	-	100	1	Exciter armature (rotor)	-	-
4	1	Rotor assembly	-	-	107	1	Diode bridge support	-	-
15	1	Fan	M8	20	110	12	Diode	-	-
21	4	Lifting eye	M12	69	111	1	Diode access door	M6	8.3
22	1	Shaft extension key	-	-	114	1	Cooling system	M12	69
28	4	Earth terminal	M12	35	115	1	Terminal box and cooling system cover	M12	69
30	1	Drive end (DE) bracket	M12	69	119	4	Silentblock	M10	20
32	2	Drive end (DE) and non drive end (NDE) bracket body	M12	69	120	1	Terminal support	M8	20
36	1	Non drive end (NDE) bracket	M12	69	121	2	Earth connection	M8	10
50	3	Terminal box access door	M8	26	122	1	Water leak detector	-	-
53	1	Sealing cap	M6	8.3	128	3	Phase busbar	M12	35
58	1	Cable entry panel	M8	26	130	1	Neutral busbar	M12	35
60	1	Drive end (DE) bearing	-	-	172	6	Isolator	M8	10
61	1	Rotor earth brush	M3	1	198	1	Voltage regulator (AVR)	M5	2.5
67	1	Circlips	-	-	247	1	Drive end (DE) lip seal	-	-
68	1	Inner bearing retainer	M10	40	320	1	Fan sleeve	-	-
70	1	Non drive end (NDE) bearing	-	-	343	1	Diode bridge assembly	M6	4
77	2	Grease nipple	M8	20	347	1	Surge suppressor (+ PCB)	-	-
78	1	Inner bearing retainer	M10	40	349	1	O ring seal	-	-
79	1	Preloading (wavy) washer	-	-	364	1	AVR support	M8	26
90	1	Exciter field (stator)	M8	20					

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Disposal and recycling instructions

We are committed to limiting the environmental impact of our activity. We continuously monitor our production processes, material sourcing and product design to improve recyclability and minimise our environmental footprint.

These instructions are for information purposes only. It is the user's responsibility to comply with local legislation regarding product disposal and recycling.

Recyclable materials

Our alternators are mainly constructed from iron, steel and copper materials, which can be reclaimed for recycling purposes.

These materials can be reclaimed through a combination of manual dismantling, mechanical separation and melting processes. Our technical support department can provide detailed directions on how to dismantle products on request.

Waste & hazardous materials

The following components and materials require special treatment and must be separated from the alternator before the recycling process:

- electronic materials found in the terminal box, including the automatic voltage regulator (198), current transformers (176), interference suppression module and other semi-conductors.
 - diode bridge (343) and surge suppressor (347), found on the alternator rotor.
 - major plastic components, such as the terminal box structure on some products.
- These components are usually marked with information concerning the type of plastic.

All materials listed above need special treatment to separate waste from reclaimable materials and should be entrusted to specialist recycling companies.

The oil and grease from the lubrication system should be treated as hazardous waste and must be treated in accordance with local legislation.

Our alternators have a specified lifetime of 20 years. After this period, the operation of the product should be stopped, regardless of its condition. Any further operation after this period will be under the sole responsibility of the user.

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Angoulême, 16th June 2024

EC Declaration

Moteurs Leroy-Somer declares hereby that the electric generators of the types:

LSA 40 – LSA 42.3 – LSA 44.3 – LSA 46.3 – LSA 47.2 – LSA 47.3 – LSA 49.1 – LSA 49.3 – LSA 50.1 – LSA 50.2 – LSA 51.2 – LSA 52.2 – LSA 52.3 – LSA 53 – LSA 53.1 – LSA 53.2 – LSA 54 – LSA 54.2 – LSA 55.3 – TAL040 – TAL 042 – TAL 044 – TAL 046 – TAL 047 – TAL 0473 – TAL 049 – LSAH 42.3 – LSAH 44.3

as well as their derivatives, manufactured by Leroy-Somer or on Leroy-Somer's behalf:

MOTEURS LEROY-SOMER

Boulevard Marcellin Leroy
16015 Angoulême
France

LEROY-SOMER ELECTRO-TECHNIQUE Co., Ltd

No1 Aimosheng Road, Galshan Town,
Cangshan District,
Fuzhou, Fujian 350026
China

MLS HOLICE STLO.SRO

Sladkovského 43
772 04 Olomouc
Czech Republic

NIDEC INDUSTRIAL AUTOMATION INDIA PRIVATE Ltd - BANGALORE

#45, Nagarur, Huskur Road
Off Tumkur Road,
Bengaluru-562 162
India

MOTEURS LEROY-SOMER

1, rue de la Burelle
Boite Postale 1517
45800 St Jean de Braye France

NIDEC INDUSTRIAL AUTOMATION INDIA PRIVATE Ltd - HUBLI

#64/A, Main Road,
Tarihal Industrial Area,
Tarihal, Hubli-580 026
India

meet the requirements of the following standards and directives:

Declaration of compliance:

- Low Voltage Directive Nr 2014/35/EU dated 26th February 2014.
- EN and IEC 60034-1, 60034-5 and 60034-22.
- ISO 8528-3 "Reciprocating internal combustion engine driven alternating current generating sets. Part3.Alternating current generators for generating sets".

These generators also comply with the ROHS Directive Nr 2011/65/EU dated 8th June 2011 and its Annex II Nr 2015/863 dated 31st March 2015, as well as the EMC Directive Nr 2014/30/EU dated 26th February 2014.

Declaration of incorporation:

These generators are designed to meet the essential requirements Annex I, chapters 1.1.2, 1.1.3, 1.1.5, 1.3.1 to 1.3.3, 1.3.6 to 1.3.8.1, 1.4.1, 1.4.2.1, 1.5.2 to 1.5.11, 1.5.13, 1.6.1, 1.6.4, 1.7 (except 1.7.1.2) of Machinery Directive Nr 2006/42/EC, as well as Annex VII, part B of this directive and the aforementioned standards.

As a result, these "Partly completed machinery" are designed to be incorporated into Electrical Gen-Sets complying with the Machinery Directive Nr 2006/42/EC dated 17th May 2006.

WARNING:

The here mentioned generators should not be commissioned until the corresponding Gen-Sets have been declared in compliance with the Directives Nr 2006/42/EC, 2014/30/EU, 2011/65/EU and 2015/863, as well as with other relevant Directives.

Moteurs Leroy-Somer undertakes to transmit, in response to a reasoned request by the national authorities, relevant information on the generator.

Those responsible for compiling the technical files and this declaration are:

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Moteurs Leroy-Somer

Headquarters: Boulevard Marcellin Leroy CS 10015 - 16915 Angoulême cedex 9 - France
T: +33 (0)5 45 64 45 64 / www.nidecpower.com
SAS with share capital of 32,239,235 € - RCS Angoulême 338 567 268.

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The contractual EC Declaration of compliance and incorporation can be obtained from your contact on request.

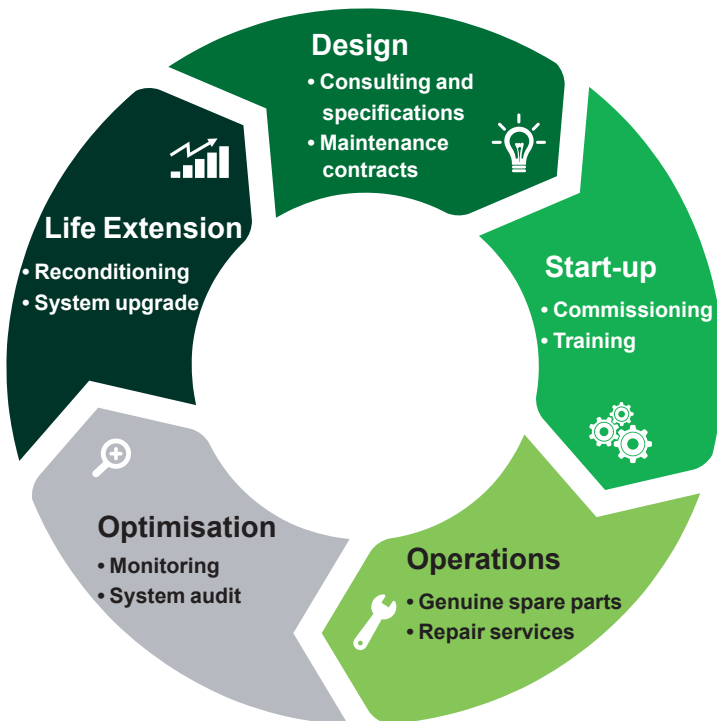
Service & Support

Our worldwide service network of over 80 facilities is at your service. Our local presence is your guarantee for fast and efficient repair, support and maintenance services.

Trust your alternator maintenance and support to electric power generation experts. Our field personnel are 100% qualified and fully trained to operate in all environments and on all machine types.

We have a deep understanding of alternators operations, providing the best value service to optimize your cost of ownership.

How can we help:



Contact us:

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EMEA: +33 238 609 908

Asia Pacific: +65 6250 8488

China: +86 591 8837 3010

India: +91 806 726 4867



service.epg@leroy-somer.com



Scan the code or go to:
www.lrsom.co/support



www.nidecpower.com

Connect with us at:

