

GEARLEC - TRACTELEC GT3 / TF3 / TM3

Low Voltage Alternator - 4 pole

Installation and maintenance

LEROY-SOMER™

Nidec
All for dreams

GEARLEC - TRACTELEC

GT3 / TF3 / TM3

**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

We wish to draw your attention to the following 2 safety measures which must be complied with:

a) During operation, do not allow anyone to stand in front of the air outlet guards, in case anything is ejected from them.

b) Do not allow children younger than 14 to go near the air outlet guards.

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: 38,679,664 €, 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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1 - RECEIPT

1.1 - Inspection

Upon receipt of your generator, check that it has not suffered any damage in transit. If there are obvious signs of damage, express your concerns to the transporter (it may be possible to claim via the transporter's insurance) and after a visual inspection, turn the generator by hand to detect any potential malfunction.

1.2 - Identification

GEARLEC/TRACTELEC are identified by a self-adhesive black/orange nameplate fixed on the machine's cowl.

Make sure that the name plate on the machine corresponds with your order.

GEARLEC/TRACTELEC incorporate alternators from the Low Voltage range that are adapted and set up for agricultural use.

The GEARLEC/TRACTELEC range consists of 2 products:

- the GEARLEC: GT3 is a product aimed at the builder of the genset or installer,

- the TRACTELEC, a ready-to-use finished product, is available:

- as a fixed version: TF3, unit mounted without chassis,
- as a mobile version: TM3, unit mounted on a three-point chassis to connect TRACTELEC to a category 1 or 2 tractor hitch in accordance with ISO 730 standard.

1.2.1 - Dimensions

The dimensions of the GEARLEC and TRACTELEC range are defined in our commercial catalogues.

1.3 - Storage

Whilst awaiting commissioning, the machines must be stored:

- away from moisture: in effect, at relative humidity levels above 90%, the machine insulation can drop very rapidly, to just above zero at around 100%; the condition of the anti-rust protection on unpainted parts should be monitored,

- if the area is affected by vibrations, try to reduce the effect of these vibrations by placing the generator on a damper support (rubber disc or similar) and turn the rotor a fraction of a turn once a fortnight to avoid marking the bearing rings.

1.4 - Applications

These alternators are mainly designed to produce electricity in the context of applications involving the use of generators.

1.5 - Usage restrictions

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

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2 - TECHNICAL CHARACTERISTICS

2.1 - Operating principle

The GEARLEC or TRACTELEC is a generator towed by an agricultural tractor. A gearbox compensates for the difference in speed between the tractor power take-off shaft and the alternator. This oil gearbox is coupled to the alternator.

2.2 - Electrical characteristics

- class H insulation,
- overload capacity: the alternators are capable of starting electric motors whose starting current is 1.5 times the rated alternator current,

- voltage regulation: the voltage is proportional to the speed (U/F),
- automatic build-up on the remanent voltage.

2.3 - Mechanical characteristics

- steel frame,
- aluminium or cast iron shields,
- sealed ball bearings (permanently greased),
- mounting arrangements: two-bearing with feet, standard splined shaft extension,
- open machine, self-cooling,
- degree of protection: IP23,
- rotation speeds on the tractor power take-off shaft (see table):

TRACTELEC Three-phase 50 Hz	Emergency power kVA	Power take-off shaft speed (min ⁻¹)
TF3 / TM3 - 16.5	16.5	429
TF3 / TM3 - 20	19.5	429
TF3 / TM3 - 27.5	27.5	429
TF3 / TM3 - 30	30	429
TF3 / TM3 - 35	35	429
TF3 / TM3 - 40	40	420
TF3 / TM3 - 45	45	420
TF3 / TM3 - 50	50	420
TF3 / TM3 - 55	55	420
TF3 / TM3 - 66	66	420

GEARLEC Three-phase 50 Hz	Emergency power kVA	Power take-off shaft speed (min ⁻¹)
GT3 - 16.5	16.5	429
GT3 - 20	19.5	429
GT3 - 27.5	27.5	429
GT3 - 30	30	429
GT3 - 35	35	429
GT3 - 40	40	420
GT3 - 45	45	420
GT3 - 50	50	420
GT3 - 55	55	420
GT3 - 66	66	420

GEARLEC Three-phase 60 Hz	Emergency power kVA	Power take-off shaft speed (min ⁻¹)
GT3 - 16.5	21	514
GT3 - 20	24	514
GT3 - 27.5	34.5	514
GT3 - 30	37.5	514
GT3 - 35	44	514
GT3 - 40	48.5	504
GT3 - 45	55	504
GT3 - 50	62	504
GT3 - 55	69	504
GT3 - 66	82.5	504

2.4 - Voltage regulation with electronic regulator



The R120 is specially adjusted for use with the GEARLEC/TRACTELEC. If the regulator needs to be changed, follow the adjustment procedure below.

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Setting up the R120

- For a 50 Hz application:

- Check that the strap U / F (marked Frequency) is in position 50 Hz

- Rotate the TRACTELEC so as to obtain a speed of 1500 min⁻¹ / 50 Hz

- Adjust the voltage to 400V with potentiometer V

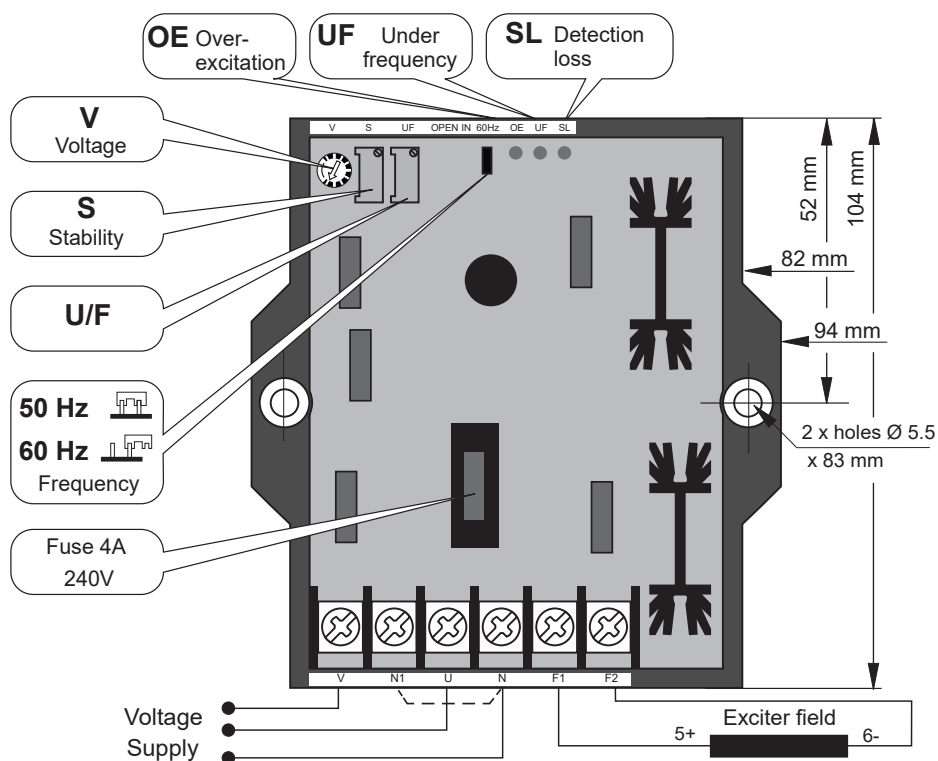
- For a 60 Hz application:

- Check that the strap U / F (marked Frequency) is in position 60 Hz

- Rotate the TRACTELEC so as to obtain a speed of 1800 min⁻¹ / 60 Hz

- Adjust the voltage to 480V with potentiometer V

For other characteristics of the regulator, see manual ref. 5243.



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3 - INSTALLATION

Staff 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 and lifting operations must be undertaken using approved equipment and the machine must be horizontal. Check how much the alternator weighs before choosing the lifting tool.

3.1.1 - Coupling

The GEARLEC or TRACTELEC is coupled to the agricultural tractor by means of a universal joint (not supplied). A housing protects the splined shaft extension at the alternator end. The universal joint must incorporate a protective device.



Unsuitable or incorrectly or damaged fitted universal joint protection can cause serious accidents.

It is prohibited to park near the alternator while it is running as the charge demand may cause the alternator and chassis to jerk and move.

3.1.2 - TF3 version: TRACTELEC without chassis

Fix the TRACTELEC securely onto a raised baseplate for optimum alignment of the universal joint link with the tractor power take-off shaft.

3.1.3 - TFM3 version: TRACTELEC with three-point chassis

The chassis is used to fix the TRACTELEC to the hitch of any tractor.

Ideally, the TRACTELEC should be placed on the ground, raising it sufficiently to align the universal joint link with the tractor power take-off shaft.

WARNING

The TRACTELEC should be fixed to the tractor's linkage during operation. If transporting a Mobile TRACTELEC mounted onto a tractor's three-point fixing, wedge the reversing rods at the side to minimise vibrations.

3.2 - Checks prior to first use

3.2.1 - Mechanical checks

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

- the fixing bolts on the feet are tight,
- the coupling is correct, and the universal joint link is aligned as closely as possible with the tractor power take-off shaft,
- cooling air is able to enter and exit freely through the machine vents,
- the protective grilles and housing are positioned correctly,
- the breather plug pin on the gearbox has been removed,
- the bearings have been inspected and the oil level of the gearbox is correct (see section 4.2).

3.2.2 - Electrical checks

Isolation measures and dielectric tests: see the alternator's maintenance manual.



Under no circumstances should an alternator, new or otherwise, be operated if the insulation is less than 1 megohm for the stator and 100,000 ohms for the other windings.

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Connection checks

Check that:

- the TRACTELEC/GEARLEC is earthed (earthing rod),
- the differential circuit breaker conform to user safety legislation 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 blue wire of the R791 interference suppression module connecting to neutral),
- the machine has been connected to the mains supply, according to the connection diagram,
- the connection of any cables and links conforms to the diagram included with the machine,
- any protection devices in place have not been tripped,
- the equipment to be supplied has its own switchgear or starter system for motors.



The earth must meet electrical standards and safety regulations in force in the country concerned.

The GEARLEC version must also be fitted with a control and protection unit enclosing all electrical accessories.

With configuration GEARLEC, in no case should the internal connections in the terminal box be subjected to stresses due to cables connected by the user.

3.3 - Setting up

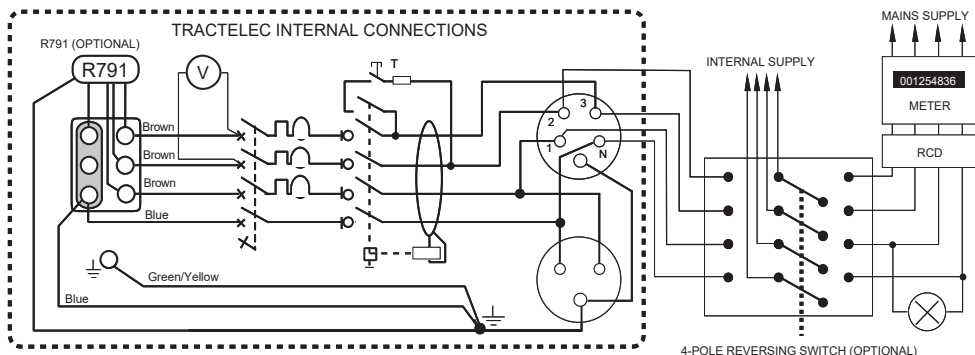
Your machine is preset and tested in the factory.

3.4 - Electrical diagram

The electrical diagram for the alternator, as well as terminal connections, is defined in the maintenance manual. With the TRACTELEC, the electrical connection must conform to the diagram below. Electrical installations must comply with the current legislation in force in the country of use.



A current reversing switch must without fail be placed between the mains supply and the GEARLEC fitted with a panel, or the TRACTELEC. Any modification of the differential security switch threshold beyond 30 mA is the sole responsibility of the user.



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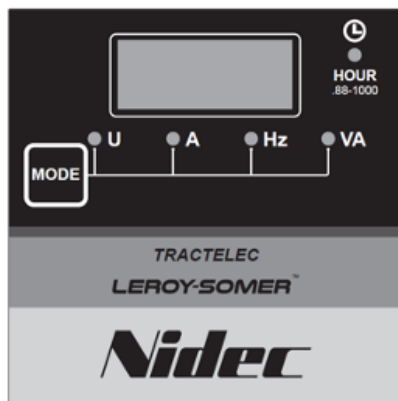
3.5 - Commissioning

- Choose a dry and dust-free area.
- Attach the Tractelec to the tractor's three-point linkage (mobile version) or check that it is correctly secured to its support (fixed version).
- Position the universal joint and check the alignment. Connect the tractor's power take-off shaft to the universal joint.
- Connect the cable coming from the supply reversing switch (position "0") to the Tractelec.
- Put the power take-off shaft into rotation, adjusting the speed until a frequency of 52 Hz is shown on the display (between 420 and 430 rpm). If necessary, select frequency display by repeatedly pressing the **MODE** button until the "Hz" indicator is lit.
- Applying a load: move the reversing switch to the "backup" position.
- Start a motor and check its direction of rotation. If necessary, swap two phase wires on the Tractelec side of the reversing switch to obtain the opposite direction of rotation.
- Start up the various motors in descending order of power, then the other devices to be powered, monitoring the voltage read-out on the voltmeter.
- If necessary, adjust the speed again until 50 Hz / 400 V is shown on the display.
- It is essential to disconnect the load (position "0" on the reversing switch) before stopping the Tractelec. Stop the tractor engine.

3.6 - Use

3.6.1 - Display panel

The Tractelec display panel allows you to check the machine's different electrical values.



Press the **MODE** button repeatedly to scroll the main display between the following values (the indicator corresponding to the selected unit will light up): U - Voltage in Volts (V) > A - Current in Amps (A) > Hz - Frequency in Hertz (Hz) > VA - Apparent power in Volt-amperes (kVA) > HOUR - Running time in hours (H).

At start-up, the display is automatically set to display U - Voltage in Volts.

3.6.1.1 - Automatic mode

It is possible to scroll through the different measurements automatically. Once the unit is turned on, press and hold (> 3 sec) the **MODE** button. The individual measured values are displayed successively at 3-second intervals. Briefly press the **MODE** button to stop scrolling and return to manual mode.

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3.6.1.2 - Running-time meter

The display panel is equipped with a meter to record the running time of the device.

The number of hours can be seen on the read-out as follows:

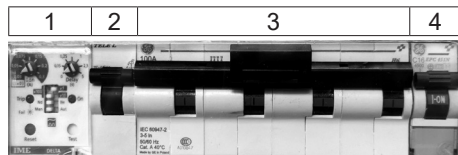
- from 0 to 999 hours "000 / 999" without decimal point
- from 1000 to 9999 hours "100. / 999." the point on the right indicating x10
- more than 10,000 hours "10.0 / 65.5" the point indicating x100

3.6.1.3 - Maximum values

The display panel can also show the maximum voltage and current values recorded during use of the machine. Use the **MODE** button to select the desired value (U or A) and hold for 8 seconds. Once the button is released, the maximum measurement stored is displayed and flashes for 10 seconds.

3.6.2 - Electrical panel

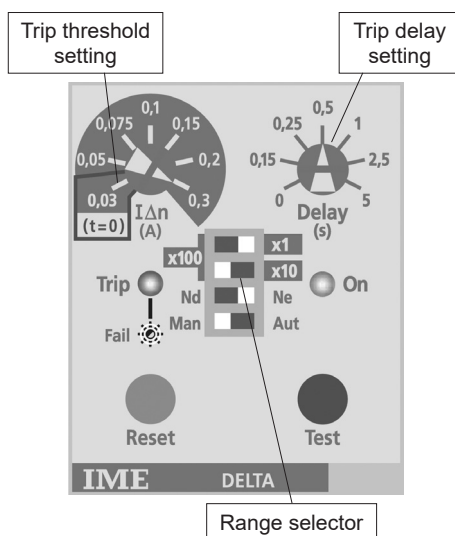
The Tractelec is equipped with an electrical panel with the following features:



1. Differential protection switch 30 mA (3P+N) with adjustable threshold
2. General circuit breaker
3. Four-pole circuit breaker (3P+N)
4. Two-pole circuit breaker (1P+N)

3.6.3 - Differential switch

The Tractelec electrical panel is equipped with a differential switch which allows the protection trip parameters to be adjusted.



The factory setting of the differential switch is 30 mA.

To change the trip threshold of the switch, turn the trip threshold setting dial and adjust the range selectors according to the table below.

	$I\Delta n$		
	X1	X10	X100
0.03	30 mA	300 mA	3 A
0.05	50 mA	500 mA	5 A
0.075	75 mA	750 mA	7.5 A
0.1	100 mA	1 A	10 A
0.15	150 mA	1.5 A	15 A
0.2	200 mA	2 A	20 A
0.3	300 mA	3 A	30 A



Any modification of the threshold of the differential protection switch above 30 mA is made under the full responsibility of the user.

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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 condition.



All such operations performed on the alternator should be undertaken by staff 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 work is carried out 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.

4.2 - Routine maintenance

4.2.1 - Inspection after start-up

After approximately 20 hours of operation, check that all fixing screws on the machine are still tight, plus the condition of the gearbox (traces of oil) and the various electrical connections in the installation.

4.2.2 - Ventilation circuit

Ensure that the suction grilles are not blocked by foreign bodies (straw, feathers, wool, etc.).

4.2.3 - Bearings

The bearings are permanently greased (see the alternator manual). A quick check of all

the generator bearings can be carried out by turning the shaft end by hand; the assembly should turn freely without sticking.

4.2.4 - Gearbox

The gearbox oil should be emptied and replaced after 50 hours of operation, then every 500 hours and in all cases, at least once a year.

Quality of oil to be used: SAE 90 oil

Quantity of oil for GT3, TF3, TM3 16.5 - 20 = 0.75 kg / 0.6735 litre

Quantity of oil for GT3, TF3, TM3 27.5 - 66 = 1.5 kg / 1.347 litre

Check the correct filling using the oil level gauge (552) of the gearbox.

4.2.5 - Servicing and storage

WARNING

Cleaning the machine using a water spray or a high-pressure washer is strictly prohibited.

Any problems arising from such treatment will not be covered by our warranty.

Store your machine in a dry, airtight place to avoid condensation.

4.3 - Fault detection

If, when commissioned, the alternator does not work normally, the source of the malfunction should be identified.

To do this, check that :

- the protection devices are switched on,
- the connections comply with the diagrams in the maintenance manuals supplied with the machine,
- the generator speed is correct, see section 2.3 (use a frequency meter rather than a revolution counter).

Repeat the operations defined in section 3.

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4.4 - Mechanical faults

See the alternator maintenance manual. For the gearbox, follow the troubleshooting guide below. Mechanical faults should be noted with the machine disconnected from the mains.

Fault	Excessive gearbox temperature rise
Action	Check oil level
Source	Lack of oil or incorrect oil level

Fault	Abnormal gearbox noise
Action	Change the bearings
Source	Faulty lubrication

Fault	Significant gearbox vibration
Action	Stop the machine
Source	Faulty universal joint coupling

4.5 - Electrical faults



Electrical faults should be noted with the machine disconnected from the mains.

See the alternator maintenance manual. For the GEARLEC or TRACTELEC, follow the troubleshooting guide below.

Fault	Voltage too high or too low
Action	Check the speed
Source	Faulty voltmeter, speed incorrectly set

Fault	No voltage
Action	Check the alternator
Source	See the alternator maintenance manual

Fault	No voltage
Action	Check protection devices
Source	Circuit-breaker, reversing switch, sockets

Fault	No voltage
Action	Check connections
Source	Wire disconnected in the terminal box

4.6 - Electronic faults

See the regulator maintenance manual, reference 5243.

4.7 - Dismantling the gearbox



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

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5 - SPARE PARTS

5.1 - 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.lrsm.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.

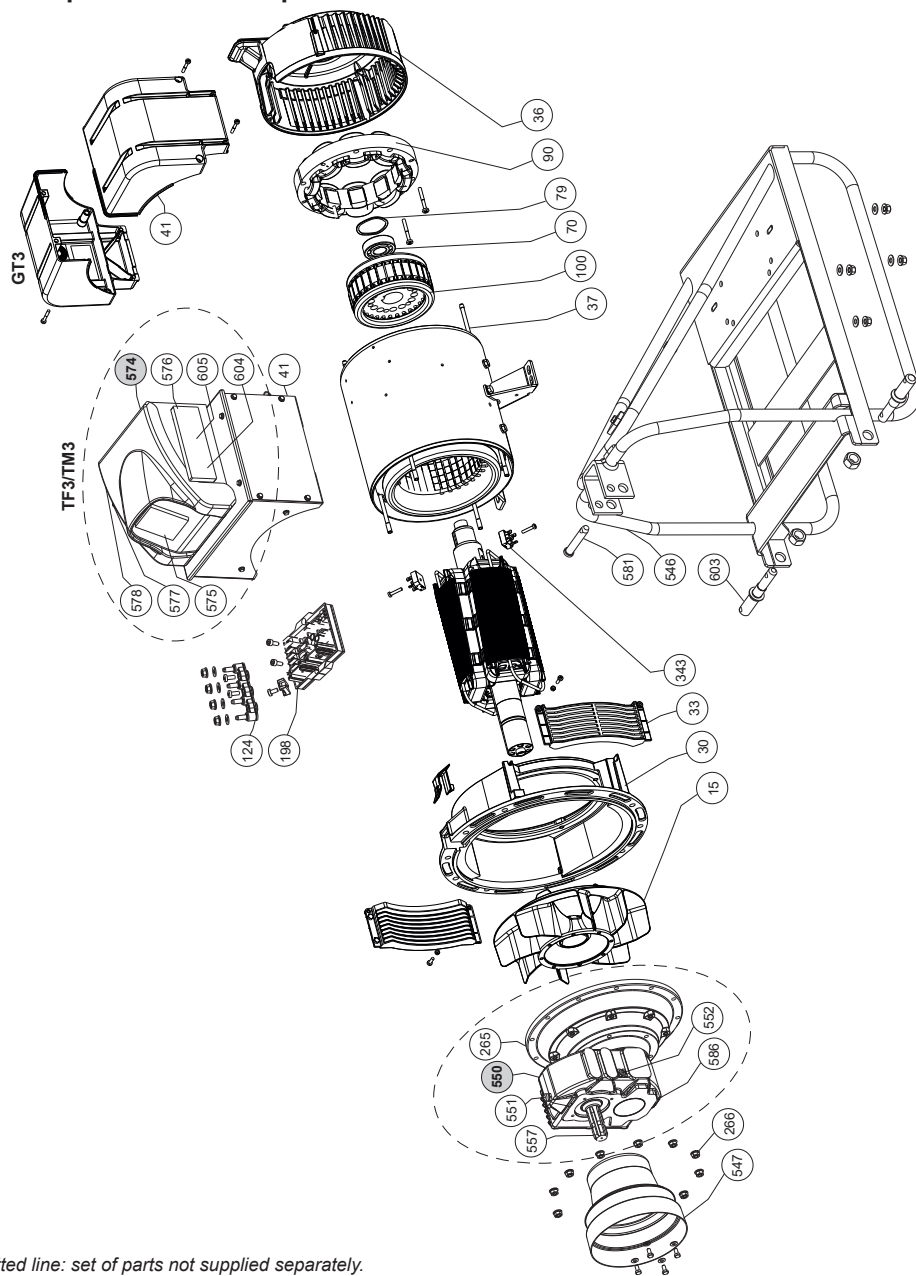
To ensure that our products operate correctly and safely, we recommend the use of original manufacturer spare parts.

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

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5.2 - Exploded view and parts list GT3 / TF3 / TM3



Dotted line: set of parts not supplied separately.

GEARLEC - TRACTELEC

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Ref.	Qty	Description	Ref.	Qty	Description
15	1	Fan	547	1	Universal joint protection
30	1	Drive end (DE) flange	550	1	Gearbox
33	2	Air outlet grille	551	1	Filling plug
36	1	Non drive end (NDE) bracket	552	1	Oil level
37	4	Tie rod	557	1	Splined input shaft
41	*	Terminal box panel	574	1	Electrical unit (Tractelec TF3/TM3)
70	1	Non drive end (NDE) bearing	575	1	Control module (Tractelec TF3/TM3)
79	1	Preloading (wavy) washer	576	1	30 mA security differential switch (3P+N) with adjustable threshold (Tractelec TF3/TM3)
90	1	Exciter field (stator)	577	1	Three-phase male + female socket (3P+N+E) (Tractelec TF3/TM3)
100	1	Exciter armature (rotor)	578	1	Single-phase male + female socket (2P+E) (Tractelec TF3/TM3)
124	1	Terminal block	581	1	King pin (Tractelec TM3)
198	1	Voltage regulator (AVR)	586	1	Drain plug
265	1	Connecting flange of the gearbox	603	2	Hitch pin (Tractelec TM3)
266	8/12	Assembly nut	604	1	Two-pole circuit-breaker (1P+N) (Tractelec TF3/TM3)
343	2	Diode bridge	605	1	Four-pole circuit-breaker (3P+N) (Tractelec TF3/TM3)
546	1	Chassis (Tractelec TM3)			

* Tractelec TF3/TM3: 1, Gearlec GT3: 2

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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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**Moteurs Leroy-Somer**

Boulevard Marcellin Leroy - CS 10015
16915 Angoulême cedex 9 - France

Angoulême, 28 October 2021

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 – TAL 040 – TAL 042 – TAL 044 – TAL 046 – TAL 047 – TAL 047.3 – TAL 049 – LSAH 42.3 – LSAH 44.3

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

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Off Tumkur Road,
Bengaluru-562 162 Inde

NIDEC INDUSTRIAL AUTOMATION INDIA PRIVATE Ltd - HUBLI

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

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. Part 3. 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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