



Totally Focused. Totally Independent.

EN

User manual

Self-regulating Alternators

S15W

S16W

S16W-HD

S20W

ES16W-HD

Operating and maintenance instructions

Code: Series SW

Revision: 02

Data: 06/2025

Translation of original language



The world's largest
independent producer of
alternators 1 – 5,000kVA

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1 General information: purpose of the manual

This manual is intended to provide support and guidance during the stages of work on the alternator. It contains information on the use, maintenance and handling of faults and malfunctions providing indications for the most adequate behavior to the correct use and to the correct operation of the machine as specified by the Manufacturer. This manual is an essential safety requirement and it must accompany the alternator throughout its life cycle. It is indispensable to store this manual and to make it available to everyone involved in using and servicing the alternator.



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MECC ALTE S.p.A. is not responsible or liable for any damages suffered by people or things as a result of improper use not indicated in this manual and by failure to comply with the specifications of the technical characteristics table pertaining to every model.

1.1 Intended Users

This manual is intended for the authorized personnel adequately trained to operate this kind of product.



Warning

The operators must not carry out operations reserved to maintenance technicians or to specialized technicians. The Manufacturer disclaims all responsibility for damages suffered as a result of failure to comply with this warning.

1.2 Professional Profiles Involved

Below we describe the professional profiles who may operate the alternator based on the kind of activity to be carried out.

Handler



Authorized skilled personnel able to safely lift and handle the alternator. The operator is not authorized to carry out maintenance operations.

Mechanical Maintenance Technician



A qualified technician able to carry out the installation, adjustment, maintenance and ordinary repair operations required. Not allowed to carry out operations with the power on.

Electrical Maintenance Operator



A qualified technician in charge with all the electrical works of connection, adjustment, maintenance and repair. Authorized to carry out operations with the power on.

Field Service Technician



A qualified technician provided by the manufacturer to carry out complex operations in special cases or, anyway, as previously agreed with the user.

1.3 Manual use and storage



Warning

Read this manual carefully before starting up the alternator or carrying out any operation on it. If you do not read it you might not be able to recognize potential hazardous situations that may lead to death or serious injuries inflicted to yourself or to others.

This manual is intended to provide all the information required for a correct use of the alternator and its most autonomous and safest possible management.

It is mandatory for all the users and the maintenance technicians to carefully read the instructions contained in this manual and in all possible annexes, before carrying out any operation on the product.

In case of doubts on the correct interpretation of the information reported in the documentation, please contact the manufacturer for clarifications.



Caution

Keep this manual and all its annexes in good condition, legible and complete in all its parts. Keep the documentation close to your alternator, in an accessible place known to all the operators and maintenance technicians and, more generally, to everyone who for various reasons should operate the alternator.



Warning

Keep the manual in its original condition. It is forbidden to rewrite, change or remove pages from the manual and their contents. The manufacturer disclaims all responsibility for any potential damages to people, animals or things as a result of failure to comply with the instructions and with the operational modalities described in this manual.



This manual is an integral part of the alternator and it must be stored for future reference.



Caution

This manual must be delivered together with the alternator in case the alternator is transferred/sold to another user.



Caution

In case the manual is lost or damaged ask for a copy from the Manufacturer indicating its identification data: document name, code, revision number and issue date.

1.4 How to consult the manual

- The manual is divided in chapters, paragraphs and subparagraphs listed in the table of contents: an easy way to find any topic of interest.
- The symbols used provide direct knowledge on the kind of information expressed by each symbol. For instance the symbol:



This symbol indicates a NOTE.

1.4.1 Description of the symbols/pictographs in the manual

Below you will find the various symbols used in the manual to highlight information of particular importance or the intended recipients of the specific pieces of information.



Danger

The risks described in this manner indicate a HIGH LEVEL of hazard that, unless avoided, could cause severe injuries or death.



Warning

The risks described in this manner indicate an INTERMEDIATE LEVEL of hazard that, unless avoided, could cause severe injuries or death.



Caution

The risks described in this manner indicate a LOW LEVEL of hazard that, unless avoided, could cause minor or moderate injuries.



This symbol indicates a NOTE; a fundamentally important piece of information or in-depth explanation.



This symbol indicates a CROSS REFERENCE; the presence of a module, of a drawing or of an annexed document that should be consulted and, if required, filled in.

1.5 Reference Regulations and Directives

List of the reference regulations and directives used for the design and construction of the alternator.

Directives

- Machinery Directive 2006/42/EC.
- Low Voltage Directive 2014/35/EC.
- EMC Directive 2014/30/EC.

Applicable Harmonized Technical Standards

- EN ISO 12100 (2010) : Safety of machinery – General principles of design – Risk assessment and risk reduction
- EN 60034-1 : Rotating Electrical Machines - Part 1 : Rating and performance.
- EN 60204-1: Safety of machinery. Electrical equipment of machines. Part 1: General Requirements
- EN61000-6-3 : Electromagnetic Compatibility (EMC) Part 6-3: Generic Standards - Emission standard for Residential, Commercial and Light-industrial Environments.
- EN61000-6-2 : Electromagnetic Compatibility (EMC) Part 6-2: Generic Standards - Immunity for industrial environments

Applicable Technical Standards

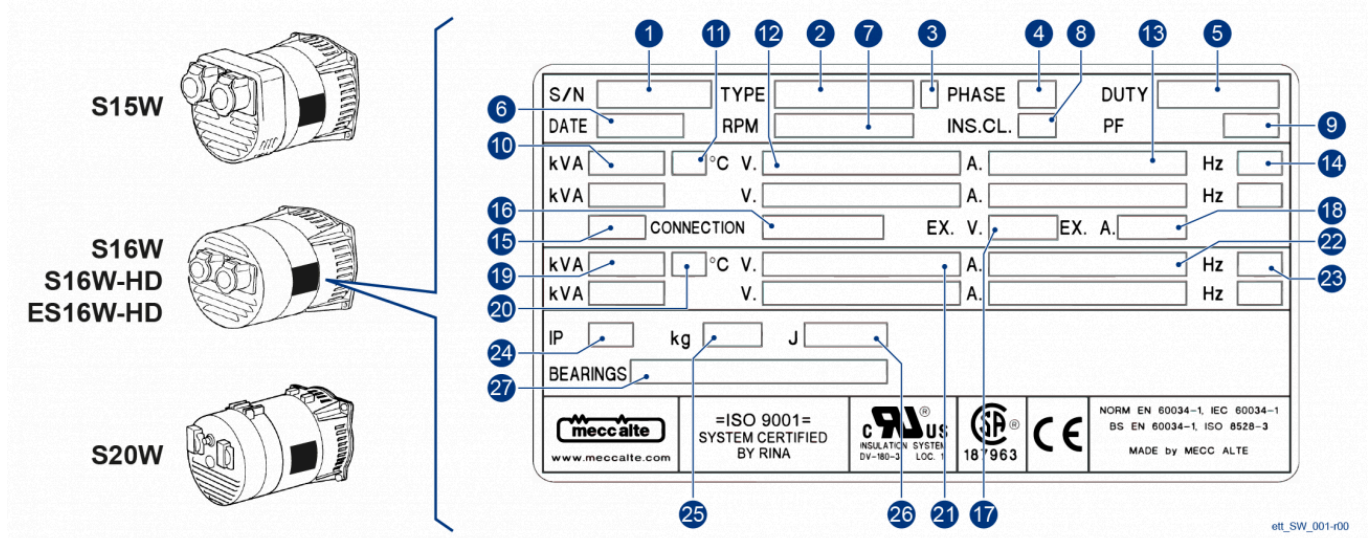
- EN 60034-2 : Method for determining losses and efficiency
- EN 60034-5 : Classification of degrees of protection (IP).
- EN 60034-6 : Methods of cooling (IC)
- EN 60034-7 : Types of construction (IM code)
- EN 60034-8 : Terminal markings and direction of rotation
- EN 60034-9 : Noise limits
- EN 60034-14 : Mechanical vibration limits
- EN 60085 : Classification of insulating materials
- ISO 1940-1 : Balance quality requirements of rigid rotors

Technical standards to be applied by the installer

- ISO 8528-9 : Reciprocating internal combustion engine driven alternating current generating sets Part 9: Measurement and evaluation of mechanical vibrations.

1.6 Marking data

Alternator Nameplate



- | | |
|---|---------------------------------------|
| 1. Serial number | 15. Nominal characteristics class |
| 2. Model | 16. Connection type |
| 3. Revision index | 17. Excitation Voltage |
| 4. Phase number | 18. Excitation Current |
| 5. Service type | 19. Power related to temperature (20) |
| 6. Manufacture month / year | 20. Ambient temperature |
| 7. Nominal speed | 21. Nominal Voltage |
| 8. Insulation class | 22. Current related to power (19) |
| 9. Power factor | 23. Nominal Frequency |
| 10. Nominal power related to temperature (11) | 24. Protection Rating |
| 11. Maximum ambient temperature | 25. Total weight |
| 12. Nominal Voltage | 26. Moment of inertia |
| 13. Nominal Current | 27. Bearing type |
| 14. Nominal Frequency | |



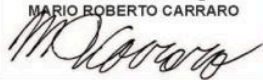
Ask for a new nameplate if the one attached to the alternator cannot be read anymore.

The nameplate is affixed on the alternator in the position indicated in the figure.

1.7 Declaration of Conformity



Below a copy of the declaration of conformity of the product. The original is placed inside the terminal box of every alternator. A true copy may be requested in case of loss.

meccalte www.meccalte.com CONFORMITY DECLARATION DICHIARAZIONE DI CONFORMITÀ DECLARATION DE CONFORMITÉ KONFORMITÄTS ERKLÄRUNG DECLARACION DE CONFORMIDAD				
Mecc Alte declares under its sole responsibility that the machine	Mecc Alte dichiara sotto la propria esclusiva responsabilità che la macchina	Mecc Alte déclare sous sa seule responsabilité que la machine	Mecc Alte erklärt in alleiniger Verantwortung, dass die Maschine	Mecc Alte declara bajo su exclusiva responsabilidad que la máquina
				
as described in the attached documents, files, is in conformity with	così come descritta nei documenti allegati, fascicoli, è conforme a	telle que décrite dans les documents, fichiers joints est conforme à	wie in den beigefügten Dokumenten, Dateien beschrieben, konform ist mit	tal como se describe en los documentos adjuntos, archiva es conforme con
2006/42/EC, 2014/35/EU, 2014/30/EU, 2011/65/EU, 2015/163, EN ISO 12100, EN 60204-1, EN IEC 61000-6-2, EN IEC 61000-6-3, EN 60034-1				
BS EN ISO 12100, BS EN 60204-1, EN IEC 61000-6-2, BS EN IEC 61000-6-3, BS EN 60034-1, Electromagnetic Compatibility Regulations 2016, Electrical Equipment (Safety) Regulations 2016, Supply of Machinery (Safety) Regulations 2016				
This machine must not be put into service until the machine in which it is intended to be incorporated into, has been declared to be in conformity with the provisions of 2006/42/CEE Machinery Directive.	Questa macchina non deve essere messa in servizio finché la macchina in cui è destinata ad essere incorporata, non sia stata dichiarata conforme alle disposizioni della Direttiva Macchine 2006/42/CEE.	Cette machine ne doit pas être mise en service tant que la machine dans laquelle elle est destinée à être intégrée n'a pas été déclarée conforme aux dispositions de la Directive Machines 2006/42/CEE.	Diese Maschine darf nicht in Betrieb genommen werden, bis die Maschine, in die sie eingebaut werden soll, für konform mit den Bestimmungen der Maschinenrichtlinie 2006/42/EWG erklärt wurde.	Esta máquina no debe ponerse en servicio hasta que la máquina en la que se pretende incorporar haya sido declarada conforme a las disposiciones de la Directiva de Máquinas 2006/42/CEE.
This declaration is in conformity with the general criteria indicated by EN17050.	Questa dichiarazione è conforme ai criteri generali indicati dalla norma europea EN17050.	Cette déclaration est conforme aux critères généraux indiqués par la norme européenne EN17050.	Diese Erklärung entspricht den allgemeinen Kriterien der europäischen Norm EN17050.	Esta declaración está en conformidad con los criterios generales indicados por la Norma Europea EN17050.
This machine was produced in:	Questa macchina è stata prodotta a:	Cette machine a été produite en:	Diese Maschine wurde produziert:	Esta máquina se produjo en:
☐ MECC ALTE via ROMA 20, 36051 Creazzo, Vicenza ITALY PIVA 01267440244 TEL +39 0444 396111 FAX +39 0444 396166 info@meccalte.it	☐ MECC ALTE UK LTD 6 LAND'S END WAY Oakham Rutland UK VAT GB 690 7302 32 TEL +44 01572 771160 FAX +44 01572 771161 info@meccalte.co.uk	☐ MECC ALTE ALTERNATOR (NANTONG) Ltd 755, NANHAI EAST ROAD JIANGSU NANTONG HEDZ 226100 PRC VAT 320684785587760 TEL (86) 513-82325758 FAX (86) 513-82325768 info@meccalte.cn	☐ MECC ALTE INDIA PVT LTD PLOT No 1 TELAGON DHAMDHERE S.O. TALUKA: SHIRUR, DISTRICT: PUNE 412208 MAHARASHTRA, INDIA TEL +91 2137 673200 FAX +91 2137 673299 info@meccalte.in	
Position Posizione Position Stelle Posición First name and surname Nome e cognome Nom et prenom Vor-und Nachname Nombre y apellido Signature Firma Signature Unterschrift Firma				L'Amministratore Delegato MARIO ROBERTO CARRARO 

Mod. CE-UKCA - IT | rev.00

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RESIDUAL RISKS LIST

The manufacturer MECC ALTE took all possible precautions to construct the generator following all safety regulations and present applicable Safety Norms.

The instruction manual explains step by step all indications required in point 1.7.4 (user instructions) of the Machines Directive and all users are specifically asked to read it carefully in order to avoid wrong operations which, even though simple, could cause damage to persons. If all instructions given are followed, no residual risks are left; however, one has to pay attention to the warnings given :

- 1) move carefully the generator (packed and unpacked)
- 2) the coupling of the generator with the drive-machine and the electrical connections should be performed by skilled personnel
- 3) do not touch the generator during function and immediately after being stopped since some parts of the generator could be hot
- 4) in case of generator with permanent magnets, take proper precautions and keep appropriate distance.

LISTA RISCHI RESIDUI

La MECC ALTE ha fatto tutto il possibile per fabbricare il generatore con il massimo della conoscenza sulle sicurezze. Suo possesso e consultando tutte le Direttive e Norme attualmente applicabili.

Il manuale d'uso ed istruzione riporta passo-passo tutte le indicazioni richieste dal punto 1.7.4 (istruzioni d'uso) della Direttiva Macchine ed è fatta specifica richiesta di leggerlo attentamente così da non incorrere in operazioni errate che, se pur minime, possono causare danni alle persone. Se vengono rispettate tutte le indicazioni fornite, non rimangono particolari rischi residui, ma solamente delle attenzioni da seguire.

- 1) movimentare il generatore con accortezza (imballato e disimballato)
- 2) far accoppiare il generatore alla macchina di trascinamento e far collegare elettricamente lo stesso, da personale adeguatamente istruito
- 3) non toccare il generatore durante il funzionamento e subito dopo l'arresto dello stesso, in quanto vi potrebbe essere parti del generatore a temperature elevate
- 4) se il generatore presenta magneti permanenti all'interno, prendere le dovute precauzioni e mantenere le giuste distanze.

LISTE DES RISQUES RÉSIDUELS

La société Mecc Alte a pris toutes ses précautions pour fabriquer les alternateurs avec la maximum de sécurité à sa connaissance, et en consultant toutes les directives et normes actuellement applicables.

Le manuel d'utilisation et d'instruction explique point par point toutes les indications requises au point 1.7.4 (instruction d'utilisation) de la Directive des Machines, et tous les utilisateurs sont spécifiquement sollicités à lire avec attention afin d'éviter toutes fausses opérations qui, même minimes, peuvent être dangereuses pour l'utilisateur. Si toutes les instructions données sont suivies, il n'y a aucun risque résiduel particulier, mais seulement quelques précautions à prendre qui sont :

- 1) manipuler l'alternateur avec prudence (emballage et déemballage)
- 2) effectuer l'accouplement entre l'alternateur avec le système d'entraînement et les connexions électriques par du personnel qualifié
- 3) ne pas toucher l'alternateur durant son fonctionnement et aussitôt après son arrêt, car certaines pièces peuvent encore être à température élevée
- 4) Dans le cas d'un générateur à aimants permanents, prendre les précautions appropriées et garder une distance appropriée.

LISTE DER NACHBLEIBENDEN GEFAHREN

Der Hersteller MECC ALTE hat alle möglichen Vorsichtsmaßnahmen bei der Herstellung des Generators nach geltenden Sicherheitsvorschriften und den z.Zt. anwendbaren Sicherheitsnormen eingehalten.

Die Bedienungsanleitung erklärt schrittweise alle Indikatoren, die in Pkt.1.7.4 (Gebrauchsanweisung) der Maschinenbauvorschrift gefragt sind. Alle Anwender werden dringend gebeten, dies aufmerksam zu lesen, um auch den kleinsten Fehler zu vermeiden, der Personenschaden verursachen könnte. Bei genauer Beachtung der Vorschriften verbleibt kein Risiko; jedoch müssen die folgenden Warnungen beachtet werden :

- 1) den Generator (verpackt und unverteilt) vorsichtig transportieren
- 2) die Kopplung des Generators mit der Antriebsmaschine und die elektrischen Verbindungen nur durch qualifiziertes Personal ausführen lassen
- 3) den Generator während des Betriebs und kurz nach dem Abstellen nicht berühren, da Teile des Generators heiß sein können
- 4) Bei Generatoren mit Dauermagneten sind entsprechende Vorsichtsmaßnahmen zu treffen und ein angemessener Abstand einzuhalten.

LISTA DE LOS RIESGOS RESIDUALES

La MECC ALTE ha hecho todo el posible para fabricar el generador con los máximos conocimientos sobre seguridad en su poder, y consultando todas las directivas y normas actualmente aplicables.

El manual de uso e instrucciones explica paso a paso todas las indicaciones requeridas por el punto 1.7.4 (instrucciones de uso) de la Directiva Máquinas, y hace una particular solicitud de leer atentamente el mismo, de manera de evitar operaciones erradas, que si bien mínimas, podrían provocar daños a las personas. Si son respetadas todas las indicaciones dadas, prácticamente no quedan riesgos residuales, a parte los siguientes puntos:

- 1) manipular el generador con cuidado (embalado y desembalado)
- 2) acoplar el generador con la máquina que da el movimiento primario, y conectar eléctricamente el mismo, por personal adecuadamente calificado
- 3) no tocar el generador durante el funcionamiento, así como, inmediatamente después que el mismo se detiene, debido a que podrían existir partes del generador a altas temperaturas
- 4) en caso de generador con imanes permanentes, tome las debidas precauciones y mantenga la distancia apropiada.

1.8 Support

For any inquiry on the use, the maintenance or a request of replacement parts, the buyer must contact the Manufacturer directly (or the help desk if present), specifying the alternator identification data indicated on the nameplate.

The Customer may resort to the technical and commercial support provided by the area representatives or by foreign branches, which are in direct contact with MECC ALTE S.p.A. and have their addresses and contact data indicated on the back cover.

In case of fault or an insurmountable inconvenience, the Customer may contact directly the headquarters using the following data:

PHONE NUMBER (Landline): + 39 0444 396111
E-MAIL: aftersales@meccalte.it
WEBSITE: www.meccalte.com
MAILING ADDRESS: MECC ALTE S.p.A
Via Roma
36051 Creazzo, Vicenza
Italy



In case of ownership transfer or company transfers of the alternator you should always inform the manufacturing company or your reference help desk.

1.9 Glossary

System:	System means, in brief, the drive motor and the alternator.
Installer:	A person / company that is in charge of building the "Fully assembled Machine" and/or installing it at the user's premises.
Fully Assembled Machine:	It is the name of the complete machine mainly made up of a "drive motor" and the alternator.
Drive motor:	It is the motor to which the alternator is connected. The manual also defines it as the "drive machine".
PPE:	Personal Protective Equipment.

2 Presentation of the alternator

SW series alternators are single phase brushless units. Their operation is highly reliable.

They require no maintenance as there are no slip rings or sliding contacts.

The end brackets are diecast in high resistance aluminum alloy, the shaft is in C45 steel and is fitted with a keyed fan.

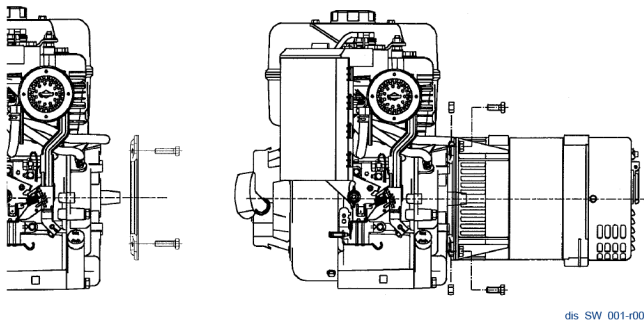
The protection rating is IP23 (higher protection ratings can be achieved on request).

Insulation is of class H standard.

The windings are impregnated with tropicalized epoxy resins.

The electromagnetic compatibility tests were carried out in compliance with the standard specifications, with the neutral wire connected to ground.

2.1 General description and operating principle

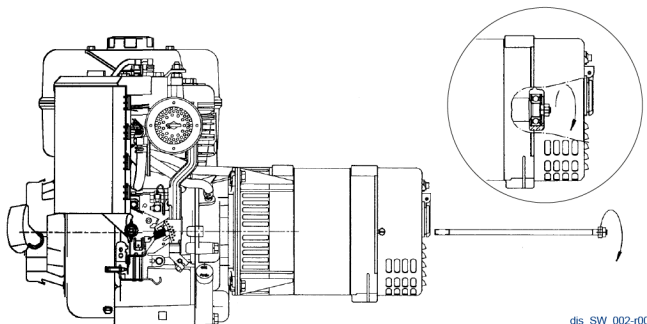


Couple flange to engine, fixing it with the appropriate M8 screws.

Secure the machine body to the flange using the appropriate M8 screws.



Apply a tightening torque of $21 \pm 7\%$ Nm.



Screw the M8 nut on the stud.

Insert the stud and screw it until the bolt is locked.



Apply a tightening torque of $21 \pm 7\%$ Nm.

Plug the hole on the terminal box lid with the proper cap.

2.2 Technical Data

2.2.1 Dynamic Data Support (DDS)

For the most up-to-date and detailed technical information, we invite you to visit the support area of the Mecc Alte website:

<http://support.meccalte.com/>

Here you will find our Dynamic Data Support (DDS), an advanced system for the dynamic generation of technical data sheets. Thanks to an intuitive guided process, you can create a customized sheet by choosing between different available variables and options. This will allow you to obtain data specific to your application and your needs, with automatic calculations updated in real time.

Through the DDS, you can select and configure some technical parameters, while others will be automatically calculated and shown in the generated technical sheet. Among the available data, you will find:

Configurable parameters:

- Frequency
- Type of winding
- Number of phases
- Voltage
- Ambient temperature
- Overtemperature
- Altitude
- International protection class (IP)

Parameters displayed in the technical sheet:

- Overall dimensions
- Noise level
- Weight
- Air volumes
- Resistance of the windings at 20°C ambient temperature



Dynamic Data Support



Once you have made your selection, the system will automatically calculate the performance based on the specific variants chosen and will send you the customized technical sheet by email.

Please note that all updated and official technical data are available exclusively within this system. To ensure maximum accuracy of the information, we invite you to always consult the DDS to obtain reliable and updated data in real time.

Furthermore, the family sheets with generic voltages are available at the following link:

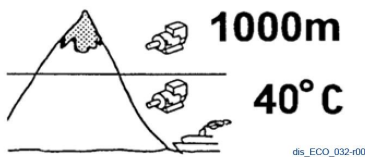
<https://www.meccalte.com/en/products/alternators/industrial>

2.2.2 Materials

The table below contains the approximate percentages of the materials used in Mecc Alte S.p.A's alternators.

Material	Percentage
Steel Parts	45%
Cast Iron Parts	20%
Copper Parts	20%
Aluminum Parts	10%
Plastic Parts	3%
Electronic parts	2%

2.3 Environmental operating conditions

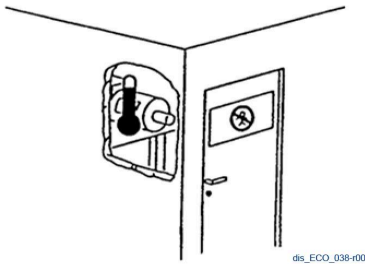


Max ambient temperature to guarantee the nominal power:

40°C

Max operating altitude to guarantee the nominal power:

Less than
1000 m.



Install the alternator in a well-aired room. Insufficient ventilation may cause overheating and malfunctioning of the alternator.

3 Safety

3.1 General warnings

The alternator may be used only for the purpose for which it was designed and built.



Caution

Alternators of the SW series comply with EC directives 2006/42 and related amendments; therefore, they pose no risk to the operator if installed, used, and maintained in accordance with Mecc Alte instructions and provided that safety devices are kept in perfect working order.



Danger

Install the alternator only after having read and understood all the sections of this manual.



Danger

Do not operate it while under the influence of intoxicating agents that might delay reaction time such as, for instance, alcohol or drugs.



Danger

The alternator installation, operation and maintenance technicians must be adequately qualified specialists who know the characteristics of the alternators.



Warning

Adequate work clothing is recommended. Avoid wearing chains, bracelets, scarves and cumbersome clothing, long hair must be tied.



Warning

Do not neutralize, remove, alter or otherwise render ineffective any safety, protection or control device of the alternator.



Warning

Maintain the work areas and the routes defined for the installation of the alternator always free from materials and/or elements that may hinder the movement of or cause accidents to the operator.



Caution

The work area must always be adequately lit.



Caution

Keep the floor in the operating area always clean and dry to prevent the forklift truck from sliding sideways when in movement.



Danger

Never operate the alternator with wet hands and objects when it is energized.



Warning

Do not lean on and do not step onto the alternator.



Warning

At the end of each operation that involved removal of the safeguards, put them back and make sure that the correct positioning and efficiency are restored.



Danger

Keep the alternator at a safe distance from flammable materials.



Danger

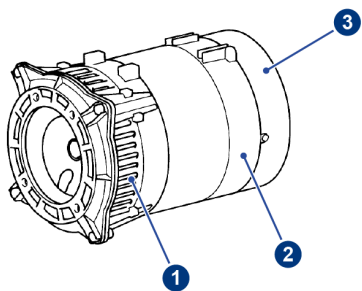
The alternators, when working, release heat even to a high level based on the power being generated. Before touching it wait for the alternator to cool off.



Danger

Working alternators are noisy (see paragraph [2.2](#)). Install the alternator in insulated rooms and wear earmuffs to operate it.

3.2 Alternator safety devices



The safety devices of the alternator are:

1. Protection on the front shield.
2. Back latch.
3. Terminal box lid.

dis_SW_031-r00

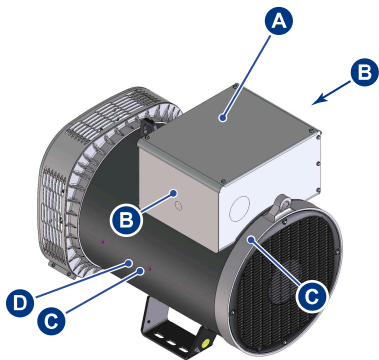


Danger

During the operation of the alternator the safeguards must always be closed.

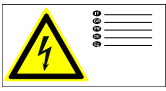
3.3 Safety tags

 **Caution**
Do not remove under any circumstances the tags attached to the alternator.
The following safety tags are attached to the machine



Isy_ECP-C_004-r00

 **Caution**
The labels must be replaced if they are worn out or cannot be read anymore.

Pos.	Label	Code	Description
A		XXX	Refer to instruction manual before removing covers
B		XXX	Danger!
C		XXX	Danger - Electricity!
D		XXX	Danger - Hot surface!

3.4 Personal Protective Equipment

 **Caution**

The staff in charge with the operation of the alternator must wear the personal protective equipment (PPE) indicated in the table below.

PPE	Operation
  	Always wear
    	Maintenance or lifting the alternator or its components.

 **Caution**

The operator must observe the accident prevention regulations in force in the specific country where the alternator is used.

 **Caution**

The PPE assigned may not be altered.

The manufacturer disclaims all responsibility for any potential damages caused to people by failure to use the PPE.

3.5 Residual risks

The alternator presents the following residual risks:

 **Danger**

Burning risk. The working alternator may release heat even to a high level.
Before touching the alternator wait for it to cool off.

 **Caution**

Risk of crushing while lifting.
Do not stand under the suspended load, do not come close to it, use adequate PPE.

4 Transport, handling and storage

Alternators of the SW series are shipped by land on pallets, by sea in fumigated wooden crates. Other shipping methods are available upon customer request.

The cases shipped by sea are covered with nylon to avoid salt infiltration that could compromise the correct operation of the alternator.

Any potential replacement parts are however shipped in cardboard packing that is disposed of according to the local regulations.

Packing is always accompanied by a packing list.

Transportation of the packing to the installation place will be provided by the customer.



Upon delivery of the alternator check against the delivery note that there are no missing parts and/or damages; in case there are any, immediately inform the carrier, the insurance company and the reseller or Mecc Alte.

4.1 General warnings



Warning

The instructions of this chapter must be strictly followed when lifting the alternator.



Warning

Use adequate, tested and certified lifting devices.



Warning

Lifting and transportation must be carried out by members of staff who were trained for this purpose.



Warning

To carry out any lifting, transportation and handling operation wear the PPE indicated by the regulations (see paragraph [3.4](#)).



Warning

When lifting the alternator with the forklift truck keep its forks at the longest possible distance one from the other so as to prevent the alternator from falling or sliding off.

Always make sure that the devices and means for packing materials removal, the alternator and any disassembled part are suitable and undamaged.

4.2 Packing materials lifting and transportation



Danger

Pay attention during all transportation and movement operations. Do not stand under suspended loads.



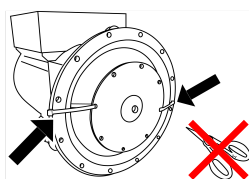
Warning

Check the packing or the documentation attached to it for the weight to lift, the predefined anchor points and use suitable equipment for the lifting.

4.3 Unpacking



Unpack the alternator carefully without breaking/damaging the packing materials. Both the cases (equipped with metal hinges so that they may be folded) and the pallet must be returned to Mecc Alte.



Once the single-bearing alternator is unpacked do not cut the tie strips of the rotor to prevent it from sliding.

4.4 How to dispose of the packing materials

Please recycle the packing materials in accordance with the applicable regulations in the country where the alternator is installed.

4.5 Alternator Movement



Unpacked alternators must always be handled hooking the eyebolts to a lifting device.



For the weight of the alternator see paragraph [2.2](#)



Caution

Lift the alternator to a height not exceeding 30 cm.



Do not add any other load. The eyebolts are only designed for the lifting of the alternator. Do not use the alternator eyebolts to lift the fully assembled machine.



Danger

Once it is coupled to the drive motor, to lift the alternator you must follow the instructions provided by the manufacturer of the fully assembled machine.

4.6 Storage

In case of storage, the alternators, be them packed or not, must be stored in a cool, dry place away from vibrations and never exposed to the elements.



The bearings require special maintenance but it is advisable to turn the shaft around once or twice a month to prevent contact corrosion and grease hardening; before startup, where regular lubrication is required, you must also lubricate it.



After being stored always check the insulation state.



Warning

The insulation test must be carried out by a qualified technician.



Warning

Before carrying out the test you must disconnect the voltage regulator.



If the result of the test is too low (less than 5 MΩ) you will have to dry the alternator by blowing 50-60 C° pressurized air into the air intakes and exhausts of the alternator.
Normally, alternator coming out of Mecc Alte always have insulation values above 500MΩ.

5 Installation instructions / coupling with driving engine



Warning

The final installer is in charge with assembling all the safeguards (disconnect switches, safeguards against direct and indirect contact, safeguards against overcurrent and overvoltage, emergency stop and so on) required to make the machine and the user system comply with the European and International Safety Regulations.



The installation and first startup operations of the fully assembled machine must be carried out by qualified personnel.



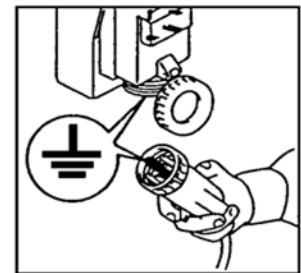
Danger

Working alternators are noisy (see paragraph [2.2](#)). Install the alternator in insulated rooms and wear earmuffs to operate it.

5.1 Installation Setup



The alternator must be grounded before installation. Please ensure that the grounding system is effective and it complies with the directives of the country where the alternator will be installed.



dis_ECO_034-r00

The alternator is designed and built to be installed in well-ventilated environments.



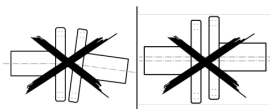
See paragraph [2.3](#)



Danger

Install the alternator in a well-aired room. Insufficient ventilation may cause overheating and malfunctioning of the alternator.

Please ensure that the base of the alternator and of the drive motor is calculated so as to support the weight of all potential stresses caused by the operation.



dis_ECO_049-r00

The installer is in charge with correctly coupling the alternator to the drive motor and all the other measures required to guarantee the correct operation of the alternator and to avoid anomalous stresses that might damage the alternator (such as vibrations, misalignments, various kinds of mechanical stresses).

5.2 Unpacking and disposal of packaging



Danger

Pay attention during all transportation and movement operations.



Danger

Do not stand under suspended loads.



Carefully remove the packing.



Please recycle the packing materials.

5.3 Mechanical coupling

The coupling of the alternator to the drive motor must be carried out by the end user. It is carried out at his sole discretion, but it must:

- Be realized in accordance with the safety regulations in force.
- Ensure the ideal operating conditions for the alternator (air temperature below 40 °C and air vents not blocked).
- Ensure easy access for its verification and maintenance.
- Be assembled on a strong base able to hold the total weight of the alternator and the drive motor.
- Observe the assembly tolerances.

Control the correct fastening of the discs to the alternator rotor.



See paragraph [8.6](#)



Imprecise alignment may cause vibrations and damages to the bearings.

Moreover, it is advisable to check the compatibility of the torsional characteristics of the motor / alternator (to be carried out by the customer).



Please see the related technical documentation.

These values are calculated so as to prevent excessive shaft flexure. The load that may be supported by the bearings is statically and dynamically higher than the one supported by the shaft, however, the presence of excessive vibrations or adverse environmental conditions may reduce the bearing's life or lead to a lower maximum allowable load in proportion to the bearing's life.

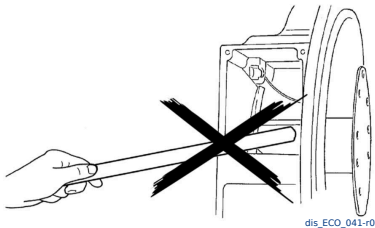


dis_ECO_036-r00

During the assembly and disassembly stages of the net, make sure you hold it in position with your hands so as to prevent the elastic net from hitting the operator or anyone else nearby.



In case of single-bearing alternators, during the drive motor coupling stage make sure the rotor does not slip out by keeping the alternator in a horizontal position. Remove the rotor fastening system, if present.

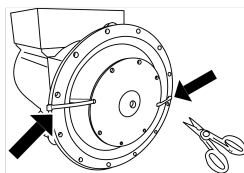


dis_ECO_041-r00



During the mechanical coupling procedures do not use the fan as a lever to turn the rotor.

5.3.1 Alternator Preparation



dis_ECO_048-r00

1. In case of single-bearing alternators remove the safety straps from the rotor. After this operation make sure the rotor does not slip out when handling it.
2. Remove the anti rust protective paint from the flange and, if it is a double-bearing alternator, also from the shaft.
3. In case the alternator was stored for more than one year, before startup lubricate the bearings again if they are not sealed (see paragraph [8.4.1](#)).

5.3.2 Compensation for thermal expansion

The compensation of thermal expansion is particularly important for the single-bearing generators inasmuch as they are connected directly to the motor and a perfect alignment is essential so as to guarantee the intended useful life of the bearings. In case of double-bearing generators the importance of this aspect depends on the type of motor-generator coupling.

Operating temperatures have a significant impact on the alignment tolerances and must be taken into consideration. Because of them, actually, during the operation, the alternator shaft may be in a different position than its position when powered off.

A compensation of the alignment may therefore be required and it depends on the operating temperatures, on the coupling type, on the distance between the two machines and so on.

The two more important types of thermal expansion to take into consideration are:

- Vertical thermal expansion
- Axial thermal expansion

Vertical thermal expansion

This thermal expansion may cause variations of the radial tolerance value and it may be calculated using the following formula:

$$\Delta H = \alpha \times \Delta T \times H$$

ΔH Variation of height.

α = Coefficient of thermal expansion (value $\alpha = 10 \times 10^{-6} \text{ K}^{-1}$ may be used).

ΔT = Difference between the alignment temperature and the operating temperature.

H = Axle height.

Axial thermal expansion

The axial thermal expansion value may diminish the axial tolerance between the two shafts.

It is a very important value inasmuch as, when the whole system reaches a uniform temperature, a very narrow non-operating tolerance may lead to an axial force that may burden the bearings damaging them or causing them to break.

The following formula may be used to calculate it:

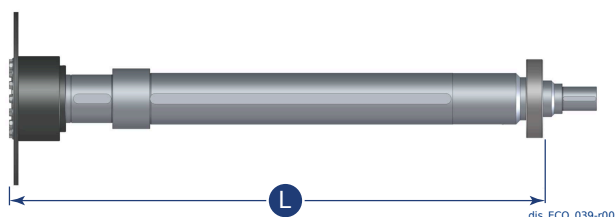
$$\Delta L = \alpha \times \Delta T \times L$$

ΔL = Variation of the shaft length.

α = Coefficient of thermal expansion (value $\alpha = 10 \times 10^{-6} \text{ K}^{-1}$ may be used).

ΔT = Difference between the alignment temperature and the operating temperature.

L = Shaft length, calculated between the bearing and the drive motor coupling discs.



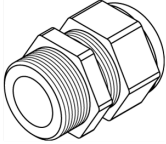
The variation of the axial tolerance is calculated by relating the axial thermal expansion of the alternator to that of the motor.

6 Electrical connection



The operation must be carried out by an electrical maintenance technician.

The electrical connection shall be provided by the end user and it is carried out at his sole discretion



dis_GEN_003-r00

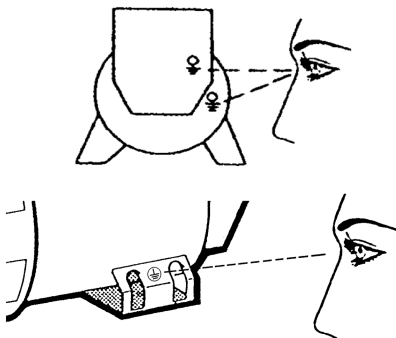
For the entry into the terminal box it is advisable to use cable glands and cable reliefs in compliance with the specifications of the user country.



The jumpers supplied with the SW series must be used in case of rewiring only where specified.

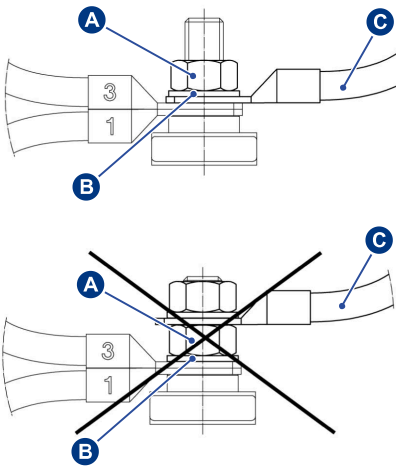


See "12 terminal connections" table in this chapter.



dis_GEN_004-r00

The alternators must always be grounded with a grounding conductor of an appropriate size. Use one of the two dedicated terminals (internal/external).



dis_GEN_005-r00

For the electrical connection use adequate cables, sized on the basis of the alternator power. Make the connections to the terminals as shown in the figure.

- A) Hexagon nut
- B) Plain washer
- C) User cable

Once the connection was made check the terminal tightening torques that must comply with the instructions given in chapter [8.6](#).

When the connection is finished reassemble the cover of the terminal box.



The user power cables must be wired and supported adequately so as not to cause mechanical stress on the terminal block of the alternator.

7 Initial start-up instructions



This paragraph only reports the instructions for the initial startup of the alternator. You may find further instructions in the manual of the fully assembled machine.



Warning

The startup, operation and stop maneuvers must be carried out by adequately qualified personnel who has read and understood the safety and technical specifications indicated in this manual.



The tools for system startup, operation and stop shall be provided by the installer.



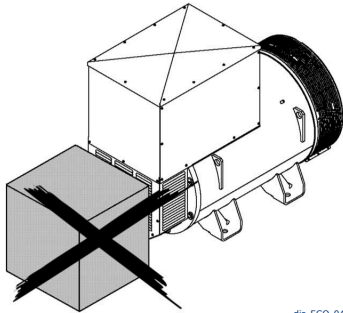
Check the alignment on the fully assembled machine.

- Check the fastening of the machine to the base with the related tightening torques and the robustness of the base.



Check the tightening torques of the terminal connections and their positioning. See paragraph [8.6](#).

Before the startup of the fully assembled machine you must make sure that:



dis_ECO_040-r00

- The cooling air intake and exhaust vents are always unobstructed. For the cooling air volumes required see paragraph [2.2](#).
- The intake side is away from heat sources. However, if not specifically agreed, the temperature of the cooling air must be equal to the room temperature and anyway lower than 40 °C. The alternator may operate at higher temperatures with an appropriate derating.



Before the start-up of the alternator, it is required to measure the winding insulation (which should be greater than 5MΩ (as per paragraph [4.6](#)))



During the initial startup that must be carried out at lower speed, the installer will have to make sure there are no anomalous noises. In case of anomalous noises stop the system immediately and make adjustments to improve the mechanical coupling.

The rotors of the Mecc Alte alternators and the alternators themselves comply with the regulations (see paragraph [1.5](#)). This means that the vibrations generated by the Mecc Alte alternators are very limited and compliant with the regulations.

Potential excessive vibrations are ascribable to the drive motor or to an erroneous motor-alternator coupling and they may cause damages or even breaks to the bearings.



The installer is responsible for following the regulations when assessing and measuring the vibrations on the fully assembled machine (see paragraph [1.5](#)).

After the initial startup

After the initial startup of the fully assembled machine it is necessary to carry out the following verifications:

- Make sure everything works correctly.
- Monitor the vibration level and potential high temperatures of the windings and of the bearings.



In case the alternator, during operation, goes into protection mode for anomalous voltage, troubleshoot the fault before initiating another startup.



See "Problems, causes and solutions" chapter [9](#).

8 Maintenance

8.1 General warnings



Warning

Before performing any maintenance, carefully read chapter [3](#) "Safety" of this manual.



Warning

The authorized operators are only allowed to carry out the works they are specifically qualified for on the alternator and wear the required PPE (personal protective equipment).



Warning

Always disconnect the alternator from power supplies before carrying out any maintenance and/or replacement operation.



Warning

The alternators, when working, release heat even to a high level based on the power being generated. Before touching it wait for the alternator to cool off.



Danger

It is forbidden to pass through or stand under the alternator during the lifting and transportation stages.



It is advisable for the maintenance technician to keep a register of all the interventions.

The SW series alternators are built to operate without maintenance for a long time.

The maintenance interventions on the Mecc Alte alternator are divided into ordinary and extraordinary.

8.2 Maintenance summary table

8.2.1 Ordinary maintenance summary table

Acronyms of the intervention types: E = Electrical; M = Mechanical

Type	Description	Periodicity	Reference
M	External and internal cleaning of the alternator	Every 15 days	8.3.6
M	General Cleaning	Every 400 hours	8.3.1
M	Visual Inspection	Every 2500 hours	8.3.2
M	Verification of winding state	Every 2500 hours	8.3.3
M	Verification of correct alternator operation	Every 2500 hours	8.3.4
M	Tightening torque check	Every 2500 hours	8.3.5

8.2.2 Extraordinary maintenance summary table

Acronyms of the intervention types: E = Electrical; M = Mechanical; S = Software

Type	Description	Periodicity	Reference
M	Maintenance of bearings and possible replacement	Every 4000 hours	8.4.1
E	Winding state and diode bridge fastening check	Every 8000 hours / 1 year	8.4.2
M	Cleaning of windings	Every 20000 to 25000 hours	8.4.4

8.2.3 Summary table of maintenance operations in case of failure

Acronyms of the intervention types: E = Electrical; M = Mechanical

Type	Description	Periodicity	Reference
E	Check and possible replacement of diode bridge	-	8.5.1
M	Mechanical disassembly for inspection	-	8.5.2
M	Mechanical assembly	-	8.5.3
E	Main stator windings voltage test	-	8.5.4

8.3 Routine maintenance

Ordinary maintenance means the set of operations that are carried out on a regular basis. Their purpose is to maintain the alternator in good operational state.



Caution

Carry out ordinary maintenance with accuracy and as often as specified by the manufacturer.

8.3.1 General Cleaning



The intervention described in this paragraph refers only to the alternator, the frequency proposed must be adapted to the actual conditions and the frequency of use.



Danger

Disconnect the alternator from the power supplies. The drive motor must be off and unplugged from its power supplies.



Warning

Never use liquids or water.



Warning

Never clean the internal electrical components of the terminal box with pressurized air because short circuits or other malfunctions may occur.



Warning

Move close to the alternator only when it has zero power supply and it is at room temperature. It is only now that you may clean it on the outside with pressurized air.

Carry out general cleaning of the alternator and the surrounding area.

During the cleaning check the state and make sure that the various parts of the alternator are undamaged.

In case of anomalies or damages contact the maintenance technician for a potential intervention/replacement.

8.3.2 Visual Inspection

Type of intervention 	Operator 	Periodicity  Every 2500 hours.
PPE to wear     		Materials and equipments Workshop tools.

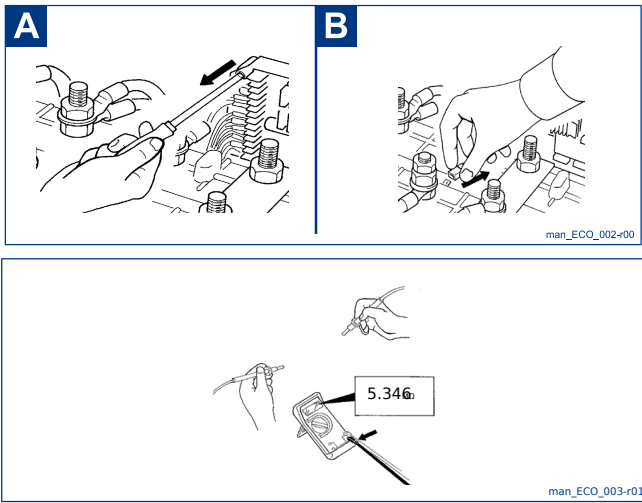
- Check for the presence of anomalies such as cracks, rust, leakages and any other anomalous event.
- Check the tightening of the power cables and of the regulator cables.
- Check the state of the insulations of the power cables and of the regulator cables (overtemperature, rubbing).

8.3.3 Verification of winding state

Type of intervention 	Operator 	Periodicity  Every 2500 hours.
PPE to wear     	Materials and equipments "Megger" Tester or similar to 500V in continuous voltage.	

 **Danger**

Disconnect the alternator from the power supplies. The drive motor must be off and unplugged from its power supplies.



 Before carrying out the verification disconnect the voltage regulator (fig. A), the radio interference filters (fig. B) and all the other potential devices electrically connected to the windings to check.

Measure insulation resistance to ground.
The measured value of resistance to ground of all the windings must be higher than 5MΩ.

 If the value is lower than 5MΩ dry the windings with a jet of hot air at 50-60°C. Direct the jet of air into the air intakes and exhausts of the alternator.

8.3.4 Verification of correct alternator operation

Type of intervention 	Operator 	Periodicity  Every 2500 hours.
PPE to wear     		Materials and equipments Workshop tools.

Check whether the alternator operates regularly without noises or anomalous vibrations.

In presence of noises and/or vibrations, check:

- The balancing of the rotor.
- The condition of the alternator bearings. Replace them if necessary (see par. [8.4.1](#)).
- The alignment of the couplings.
- The potential presence of stresses in the heat engine.
- The potential presence of stresses in the anti-vibration supports.
- The functional data (see alternator nameplate par. [1.6](#)).

8.3.5 Tightening torque check

Type of intervention 	Operator 	Periodicity  Every 2500 hours.
PPE to wear     		Materials and equipments The torque wrench.



Danger

Disconnect the alternator from the power supplies. The drive motor must be off and unplugged from its power supplies.

- Check the tightening status of the bolts (see par. [8.6](#)).
- Check the electrical connections.

8.3.6 External and internal cleaning of the alternator

Type of intervention 	Operator 	Periodicity  Every 15 days
PPE to wear     		Materials and equipments • Industrial vacuum cleaner equipped with dust filter • Antistatic brushes • Compressed air (not to be used on the active parts of the wound components, according to the methods indicated below).

Method of intervention:

For cleaning the external and internal surfaces of the alternator, it is recommended to use industrial vacuum cleaners in order to avoid the movement of dust and any residues inside the slots of the windings, a condition that could compromise the levels of electrical insulation.

The use of compressed air to clean the windings and internal parts is not recommended because:

- It can push dirt into the winding slots, reducing the effectiveness of the electrical insulation;
- If it does not come from systems equipped with dryers (for example mobile compressors without water separators), it can contain condensation and introduce humidity into the electrical components, with the risk of contamination and reduction of insulation.

The use of compressed air should be avoided or limited exclusively to cleaning external surfaces, provided that:

- The air comes from systems equipped with a dryer and suitable filters;
- The pressure used is controlled to avoid mechanical damage to external components;
- It is not directed directly towards openings, slots or ventilation grilles, to avoid the entry of dust into the alternator and active components.



The use of any type of pressure washer and cleaning liquids near the alternator is absolutely prohibited. The standard protection level of the alternator is IP23 and therefore using liquids could cause anomalies or even short circuits.



The intervention periodicity indicated refers to critical environmental conditions. Adapt the periodicity based on the actual conditions of use.

8.4 Extraordinary maintenance



Caution

Carry out extraordinary maintenance with accuracy and as often as specified by the manufacturer.



Warning

All the maintenance intervals described below refer to a normal use of the alternator. In case it is used in more severe conditions (high humidity, temperature or dust) it is necessary to check it more often.

8.4.1 Maintenance of bearings and possible replacement

Type of intervention	Operator	Periodicity
		 Every 4000 hours
PPE to wear		Materials and equipments
    		SKF LGMT2 or ENS or equivalent greases.



Danger

Disconnect the alternator from the power supplies. The drive motor must be off and unplugged from its power supplies.

- Check the state of the bearings.
- Lubricate the bearings if they are equipped with a lubricator.

Bearing lubrication table

Alternator	TYPE	Bearing type		Lubrication interval hours		Grease grams	
		Coupling side	Opposite coupling side	Coupling side	Opposite coupling side	C.S.	O.C.S.
S15W	Standard	-	6202-2RS1	- (*)	- (*)	-	-
S16W	Standard	-	6203-2ZC3	- (*)	- (*)	-	-
S16W-HD	Standard	-	6203-2ZC3	- (*)	- (*)	-	-
S20W	Standard	-	6205-2RS	- (*)	- (*)	-	-
ES16W-HD	Standard	-	6203-2ZC3	- (*)	- (*)	-	-

* Sealed bearings: it is not necessary any maintenance during their entire operating life; in normal working conditions the estimated life is about 30,000 hours.

** In normal working conditions the regreaseable bearings have an estimated life of about 40,000 hours.



For possible replacement, follow the instructions given in paragraph [8.5.2](#).



It is mandatory to verify, for all machines equipped with a grease nipple, that the required lubrication intervals are respected. In fact, re-greaseable bearings need to work ONLY if suitably lubricated.

8.4.2 Check winding condition

Type of intervention 	Operator 	Periodicity  Every 8000 hours / 1 year
PPE to wear   		Materials and equipments Workshop tools.



Danger

Disconnect the alternator from the power supplies. The drive motor must be off and unplugged from its power supplies.

Remove the back grid of the alternator for visual inspection of the windings and to check the fastening of the diode bridge.

If the windings are dirty or oily clean them with pressurized air.

In case problems of other kind are detected you must disassemble the alternator to solve them.

8.4.3 Copy of the alarms of the digital regulator

Type of intervention 	Operator 	Periodicity  Every 8000 hours / 1 year
PPE to wear  		Materials and equipments Personal Computer + interface + dedicated software.



Danger

Disconnect the alternator from the power supplies. The drive motor must be off and unplugged from its power supplies.

Mecc Alte's digital regulator are equipped with a special connector that allows you to download the data related to the recorded alarms.

Download this data to check the potential presence of anomalies and, if any, solve them.

8.4.4 Cleaning of windings

Type of intervention 	Operator 	Periodicity  Every 20000 to 25000 hours.
PPE to wear   	Materials and equipments Cleaning tools	



Danger

Disconnect the alternator from the power supplies. The drive motor must be off and unplugged from its power supplies.



Caution

If the system operates in a dusty environment, the cleaning operations must be carried out more frequently.



Cleaning must be carried out using adequate products.

Disassemble the alternator for general cleaning.

In such case it is advisable to replace the bearings for an optimization of the maintenance interventions for the entire group.

The windings must be cleaned using a low pressure jet of hot water at a temperature below 80 °C or using adequate highly-evaporable solvents suitable for the cleaning of electrical windings.

These solvents allow an adequate cleaning without damaging the insulation of the windings.

When the cleaning is finished it is advisable to check if there are any signs of overheating and potential traces of carbonizations.

After the drying process at approximately 60-80°C is finished you must check again the insulation resistance of the windings.

In case you notice a degradation of the winding paint, paint them again.

8.5 Maintenance in case of failure

8.5.1 Check and possible replacement of diode bridge

Type of intervention 	Operator 	Periodicity 
PPE to wear     	Materials and equipments Workshop tools.	



Danger

Disconnect the alternator from the power supplies. The drive motor must be off and unplugged from its power supplies.

Alternators of the SW series are equipped with diodes.

Each individual diode can be easily checked with a multimeter set specifically for diode testing. Completely disconnect the cables and check each diode in both directions. In case of one or more failures, it is advisable to replace the entire diode. When reinstalling the diode, it is recommended to respect the polarity.

In order to simplify the access to the diode bridge we recommend to remove the main rotor (if the alternator is not coupled with the engine) or the non drive end bracket. In this last case it is sufficient to unscrew the stay bolts and use a special extractor to remove the bracket.

Necessary equipment :

- A. 12V battery
- B. 12V-21W lamp (or alternatively 6.8Ω - 30W resistance)
- C. Voltmeter (for instance, multimeter on scale VOLT d.c)



before performing the following actions, it is necessary to disconnect the 2 cables connecting the main rotor to the diode bridge (+ and -).

Test of the diodes on the "negative"

-) Connect the equipment, as it is pointed out in the picture A
-) Fix the cable connected to the lamp to the negative terminal of the bridge, as it is pointed out in the picture A
-) Connect the terminal "Probe" (Y) to the point A1, A2, and A3 in sequence to check the diodes 1,2 e 3 respectively; check the readings on the voltmeter in relation with what is reported on the table.

Test of the diodes on the "positive"

-) Connect the equipment, as it is pointed out in the picture B
-) Fix the cable connected to the negative terminal of the battery to the positive terminal of the bridge, as it is pointed out in the picture B
-) Connect the terminal "Probe" to the point A4, A5, and A6 in sequence to check the diodes 4,5 e 6 respectively; check the readings on the voltmeter in relation with what is reported on the table.

8.5.2 Mechanical disassembly for inspection

Type of intervention 	Operator 	Periodicity 
PPE to wear     	Materials and equipments Workshop tools.	



Danger

Disconnect the alternator from the power supplies. The drive motor must be off and unplugged from its power supplies.

Summary Disassembly Procedure.

Front Cover	To remove the front cover gently tap with a rubber mallet.
Rotor	The rotor is extracted from the front side; in performing this operation care must be taken to ensure the rotor does not fall.  During this operation you must be very careful not to damage the rotor windings.
Back cover	To dismantle the rear bracket, it must be secured to a suitable lifting system and an extractor must be used.  With the extractor, the shaft must be pushed until the bearing comes out completely from its seat.
General Inspection	Examine every component (windings: exciter, auxiliary winding, stator and rotor) to check the presence of damages.  Carefully check whether the crimp connectors are damaged.
Stator/Frame Inspection	• Carry out a visual inspection of the stator and of the frame. • Remove all dirt and dust. • Repair all potential damages to the windings. • Inspect the cable terminals and make sure they comply with the applicable regulations.
Shaft Inspection	Examine the shaft and the housings for the keys to check the presence of any sign of corrosion, burrs or wear. Clean them and, if necessary polish them.  If the degree of wear of the shaft is too high, take it to a service center for repair or replacement.

**Front/Back bearing
disassembling**

- The bearings must be removed using the appropriate extractors.
- The sizes of the bearings must be measured accurately to check the presence of excessive wear.
- In case of excessive wear or anomalous noises / vibrations, replace them.

Electrical Inspections

Check the cable terminals and make sure they guarantee good contact. Make sure there are no signs of corrosion and/or oxidation.

Check whether the cable sheath is undamaged. If there are damage signs, repair or replace the cable.

Using adequate tools, check the resistance, the continuity and the insulation of the following windings (see paragraph [8.5.4](#)):

- Main Stator.
- Auxiliary Winding.
- Main rotor.
- Exciter Stator.
- Exciter Rotor.
- Thermal probes (if present).

Check whether the diodes and the varistor are damaged.



All the measurement tools must be calibrated.

Insulation checks

Check the insulation resistance of the following windings:

Main Stator:

- Between phases and between phases and ground.
- Between phases and the auxiliary winding.
- Between auxiliary winding and ground.

Main rotor and exciter rotor:

- Between winding and ground.

Exciter Stator:

- Between winding and ground.



See par. [8.5.4](#)

The internal windings of the machine might need accurate cleaning. Use an appropriate solvent or hot water. Dry them and, if necessary, impregnate them again.

8.5.3 Mechanical assembly

Reassembling bearings

Heat the bearings in an appropriate induction equipment.
Insert them into the shaft by pushing them to the end stop against the shoulder.



The heating temperature must not exceed the limit imposed by the manufacturer.

Rotor



Reassemble the rotor being very careful not to damage the windings.

Front Cover

To remove the front cover gently tap with a rubber hammer.

Back cover

During the assembling check the voltage of the exciter stator wires to avoid damaging them.

Fixing rod/bolts

To assemble the fixing rods and bolts use new washers and tighten them with the correct tightening torque.

In case of double-bearing alternators, once assembled, turn them manually to check whether there are impediments and anomalous noises.

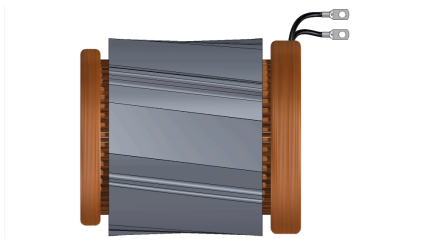
In case of single-bearing alternators, this check must be carried out during the test, after the coupling with the drive motor.

8.5.4 Main stator windings voltage test

Type of intervention	Operator	Periodicity
		
PPE to wear	Materials and equipments	
  	Electrical tools.	

Use a multimeter to check all three phases (both L-L and L-N).
When off-load the voltage should be balanced on all three phases with a $\pm 1\%$ tolerance.
If the voltage is unbalanced, this indicates a problem in the main winding of the stator.
If instead the voltage is balanced on the three phases, then the winding of the stator does not have problems.
If the voltage is lower than 15% of the nominal voltage, there might be a problem with the regulator, in the rotating diode bridge or in the exciter winding.

8.5.4.1 Resistance/Continuity Test



dis_GEN_001-r00

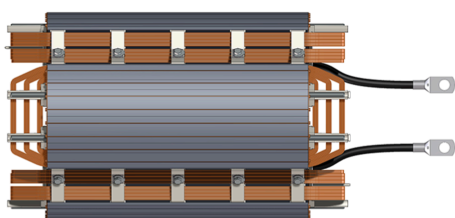
Main Stator

Use an appropriate tool to measure the phase resistance/continuity.

Also check the resistance/continuity of the auxiliary winding between the two red wires coming out of the main stator.



For the values see paragraph [2.2](#)



dis_GEN_006-r00

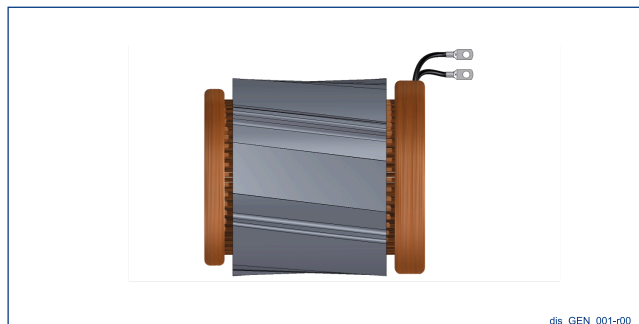
Main rotor

Measure the resistance/continuity of the main rotor using a multimeter.



For the values see paragraph [2.2](#)

8.5.4.2 Insulation test



Main Stator

Completely disconnect the AVR and the connection between neutral and ground before performing this test. The measurement must be carried out using an insulation tester (Megger) of 500 V.

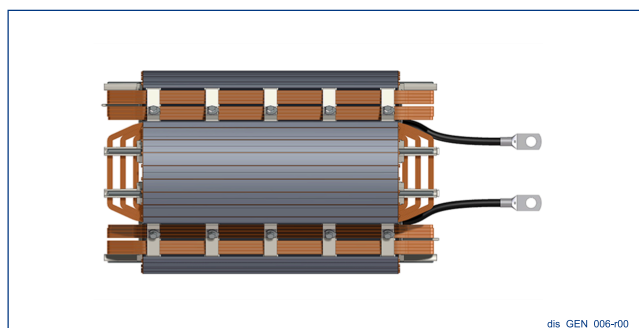
Check the insulation between phases, between phases and ground, between auxiliary and phases and between auxiliary and ground.



For these alternators, the minimum insulation value is of 5 MΩ.

If the measured insulation resistance is lower, the stator must be cleaned or impregnated and repainted with gray paint EG43, and then dried at 50-60 °C.

If after these operations the value remains low, the stator must be rewound or replaced.



Main rotor

The insulation resistance is measured between phase and ground using an insulation tester (Megger).



For these alternators, the minimum insulation value is of 5 MΩ.

If the insulation resistance is lower, the rotor must be cleaned and, if necessary, impregnated and then dried at 50-60 °C.

If after these operations the value remains low, the rotor must be rewound or replaced.

8.6 General tightening torques

S15W

Application		Screw type		Tightening torque [Nm] ± 7%	Replacement parts cat. reference
Cover rod	45	M5 x 95		3.3	28
Cover rod	60	M5 x 110		3.3	28
Cover rod	75	M5 x 125		3.3	28
Cover rod	85	M5 x 135		3.3	28
Cover rod	102	M5 x 153		3.3	28
Front Cover		M6 x 20		7	9
Rear lid		M5 x 10	CL. 4.8	3.3	2
NDE bracket ground		M3.5 x 9.5	CL. 8.8	2.8	
Fan fastening		M4.2 x 16	CL. 8.8	4.2	15

S16W

Application		Screw type		Tightening torque [Nm] ± 7%	Replacement parts cat. reference
Cover rod	60	M6 x 113		7	28
Cover rod	75	M6 x 132		7	28
Cover rod	90	M6 x 143		7	28
Cover rod	105	M6 x 158		7	28
Cover rod	130	M6 x 183		7	28
Cover rod	150	M6 x 203		7	28
Front Cover		M8 x 16	CL. 4.8	21	9a
Rear lid		M5 x 10	CL. 4.8	3.3	2
NDE bracket ground		M3.5 x 9.5	CL. 8.8	2.8	
Fan fastening		M4.2 x 16	CL. 4.8	4.2	15

S16W-HD

Application		Screw type		Tightening torque [Nm] ± 7%	Replacement parts cat. reference
Cover rod	60	M6 x 113		7	28
Cover rod	75	M6 x 132		7	28
Cover rod	90	M6 x 143		7	28
Cover rod	105	M6 x 158		7	28
Cover rod	130	M6 x 183		7	28
Cover rod	150	M6 x 203		7	28

Front Cover	M8 x 16	CL. 4.8	21	9a
Rear lid	M5 x 10	CL. 4.8	3.3	2
NDE bracket ground	M3.5 x 9.5	CL. 8.8	2.8	
Fan fastening	M4.2 x 16	CL. 4.8	4.2	15

S20W

Application		Screw type		Tightening torque [Nm] ± 7%	Replacement parts cat. reference
Cover rod	90	M6 x 153		7	28
Cover rod	110	M6 x 173		7	28
Cover rod	130	M6 x 193		7	28
Cover rod	150	M6 x 213		7	28
Front Cover		M8 x 25	CL. 8.8	21	9
Rear lid		M5 x 10	CL. 4.8	3.5	2
NDE bracket ground		M3.5 x 9.5	CL. 8.8	2.8	
Fan fastening		M4.2 x 16	CL. 8.8	3.3	15

ES16W-HD

Application		Screw type		Tightening torque [Nm] ± 7%	Replacement parts cat. reference
Cover rod	60	M6 x 113		7	28
Cover rod	75	M6 x 132		7	28
Cover rod	90	M6 x 143		7	28
Cover rod	105	M6 x 158		7	28
Cover rod	130	M6 x 183		7	28
Cover rod	150	M6 x 203		7	28
Front Cover		M8 x 16	CL. 4.8	21	9a
Rear lid		M5 x 10	CL. 4.8	3.3	2
NDE bracket ground		M3.5 x 9.5	CL. 8.8	2.8	
Fan fastening		M4.2 x 16	CL. 4.8	4.2	15

9 Problems, causes and remedies

The alternator does not excite

Causes	Remedies
Low speed	Check speed and set at nominal value
Faulty condenser	Check and replace capacitor
Faulty windings	Check windings resistance
Blown fuse *	Replace the fuse *
Worn brushes *	Replace the brushes *
	For an instant apply on "1" and "2" of the electronic regulator a 12 V battery voltage with a 30 Ω resistor in series, respecting the polarities *

* Only ES16W-HD

The alternator, after excitation, de-excites *

Causes	Remedies
Incorrect or loose connections	Check connection cables as per attached drawings
Faulty regulator	Check and replace regulator

* Only ES16W-HD

Low no-load voltage

Causes	Remedies
Low speed	Check and adjust speed
Low capacity of condenser	Check and replace capacitor
Worn windings	Check windings resistance
Faulty rotary diodes	Check and replace diodes
Worn brushes *	Replace the brushes *
	Reset voltage potentiometer *

* Only ES16W-HD

Excessive no-load voltage

Causes	Remedies
Excessive speed	Check and adjust speed
High capacity of condenser	Check and replace capacitor
Faulty regulator *	Replace the regulator *
	Reset voltage potentiometer *

* Only ES16W-HD

Correct no-load voltage but low under load

Causes	Remedies
Low speed in loaded conditions	Check and adjust speed
Excessive load	Check and reduce load
Short-circuited rotary diodes	Check and replace diodes
Faulty regulator *	Replace the regulator *
Worn brushes *	Replace the brushes *
Current too high, power factor lower than 0.8, speed lower than 4% of rated speed *	

* Only ES16W-HD

Correct no-load voltage but high under load

Causes	Remedies
Excessive speed in loaded conditions	Check and adjust speed
Faulty regulator *	Replace the regulator *
	Reset voltage potentiometer *

* Only ES16W-HD

Unstable voltage

Causes	Remedies
Loose contacts	Check connections
Uneven rotation	Check for uniform rotation speed
	Adjust stability of the regulator by turning the "STAB" potentiometer *

* Only ES16W-HD

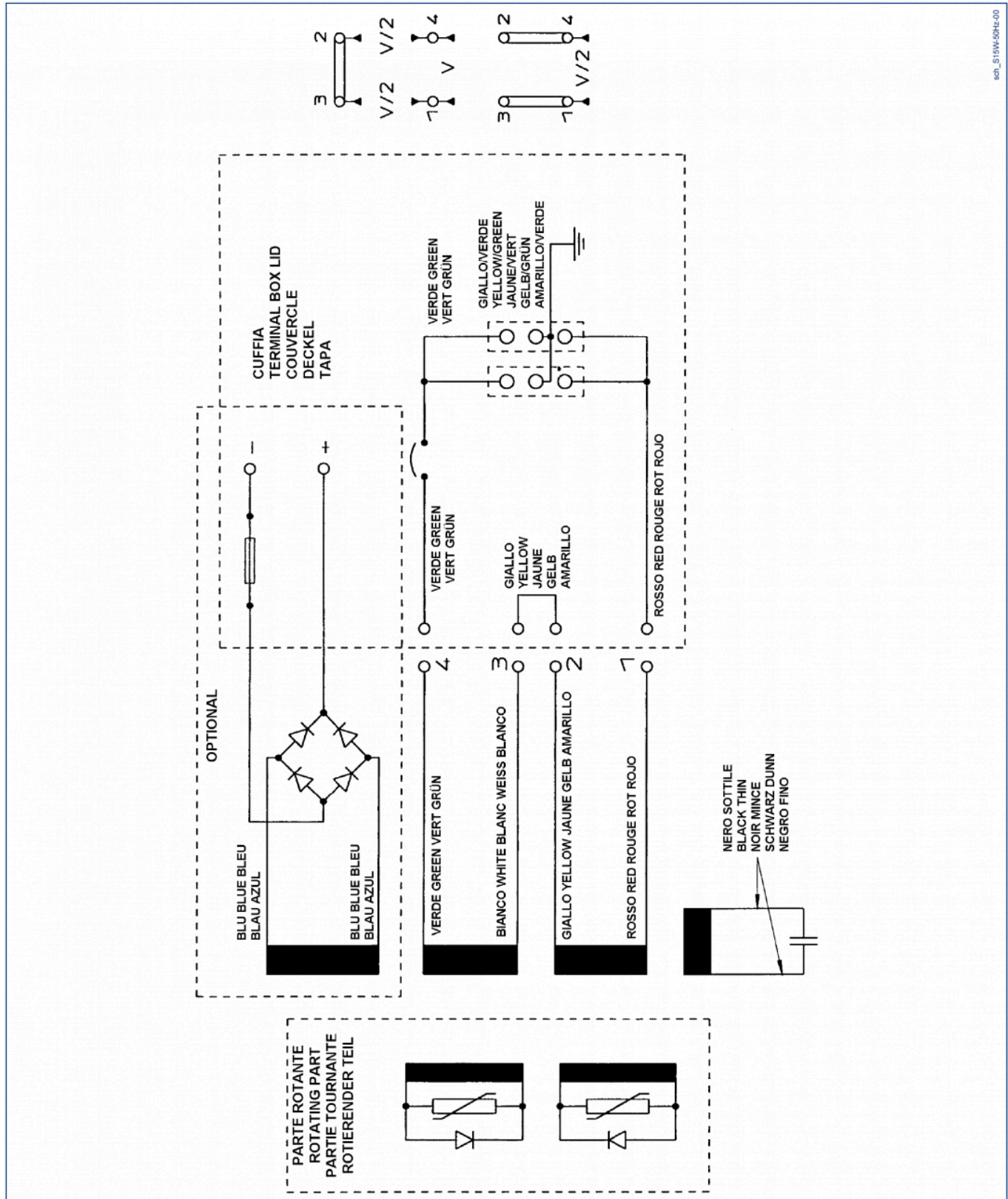
The alternator is noisy

Causes	Remedies
Worn bearings	Replace bearings
Faulty coupling	Check and repair

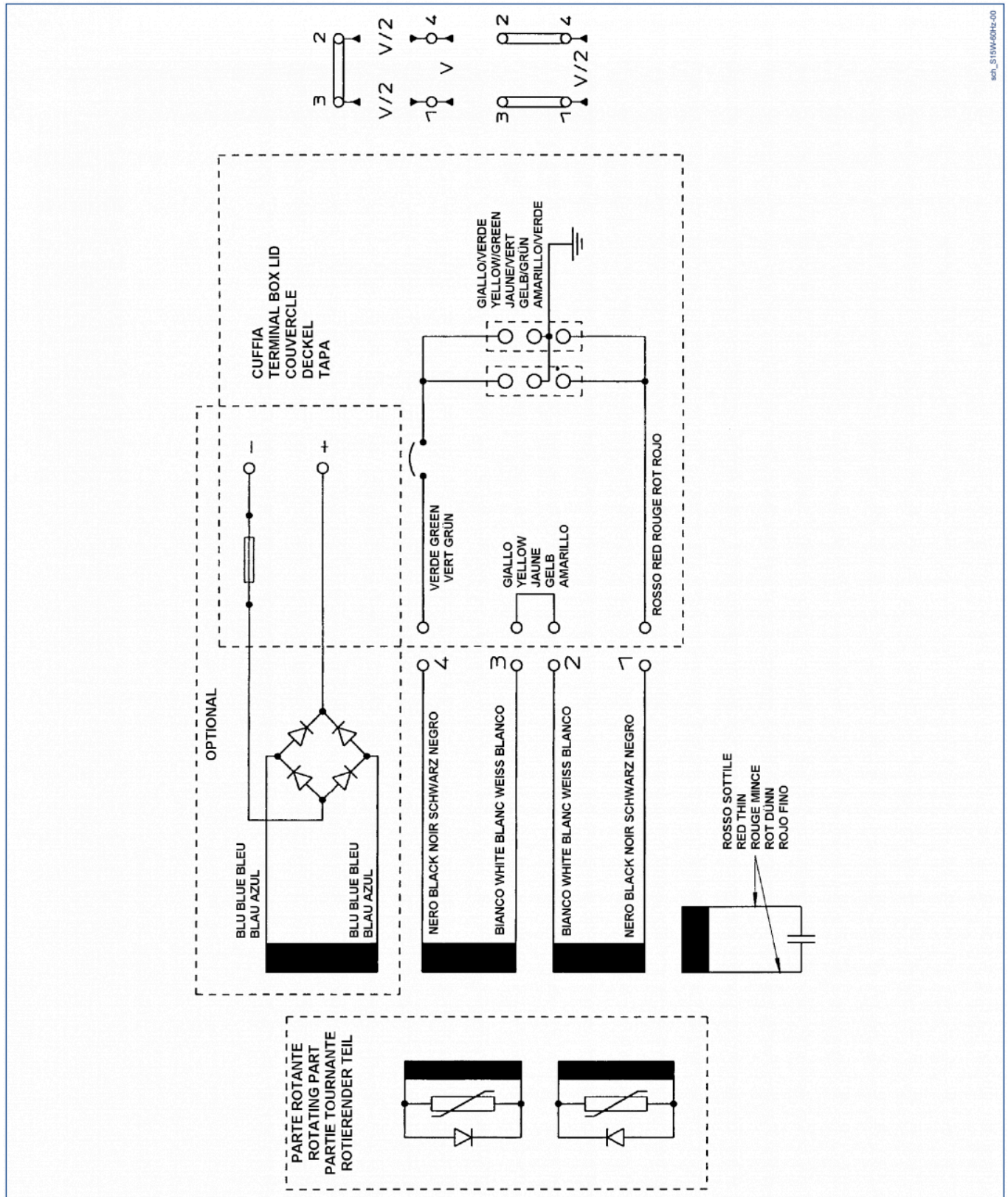
10 Wiring diagrams

10.1 Wiring diagrams S15W

50 Hz

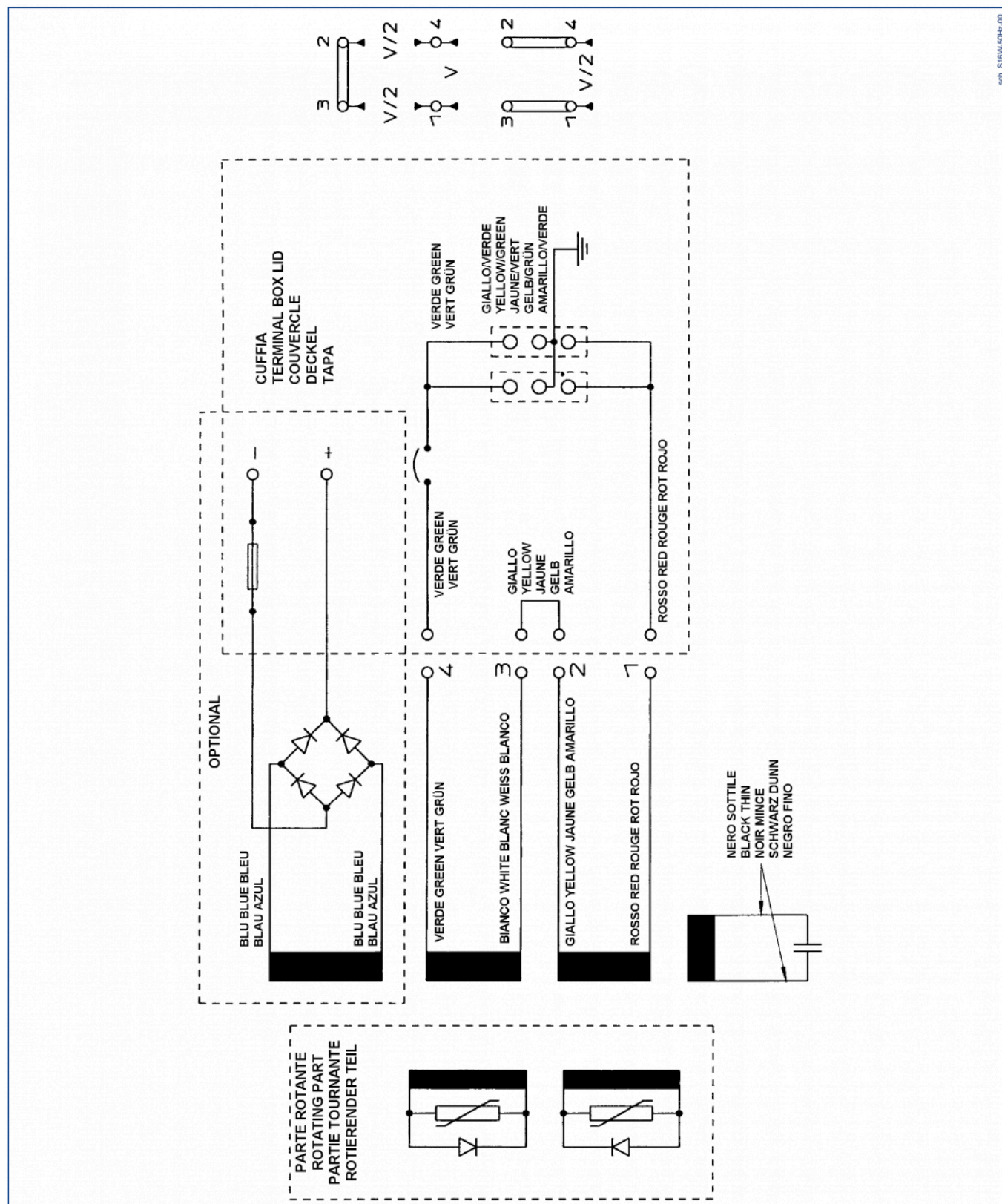


60 Hz

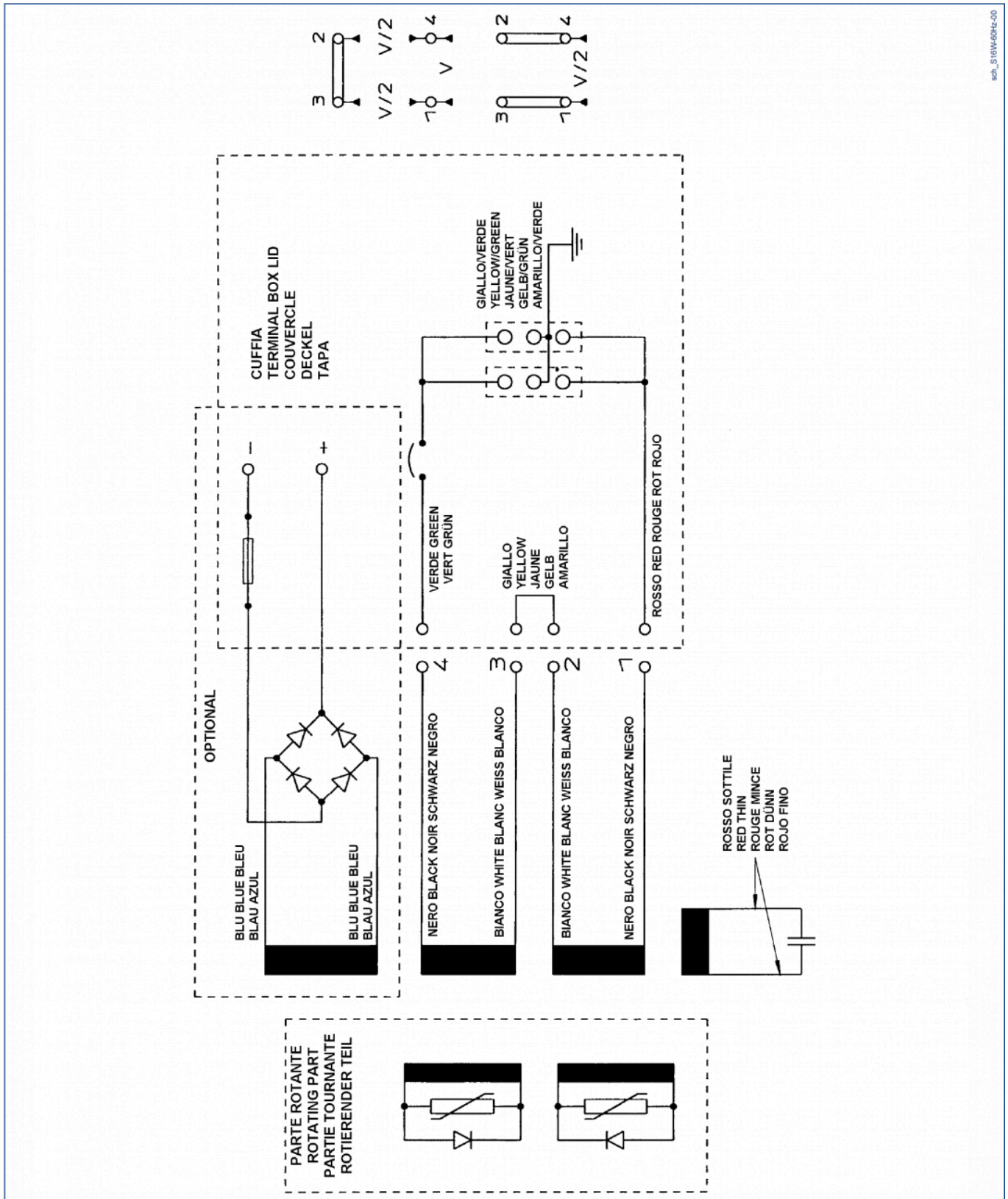


sch_S15W-60Hz-00

50 Hz



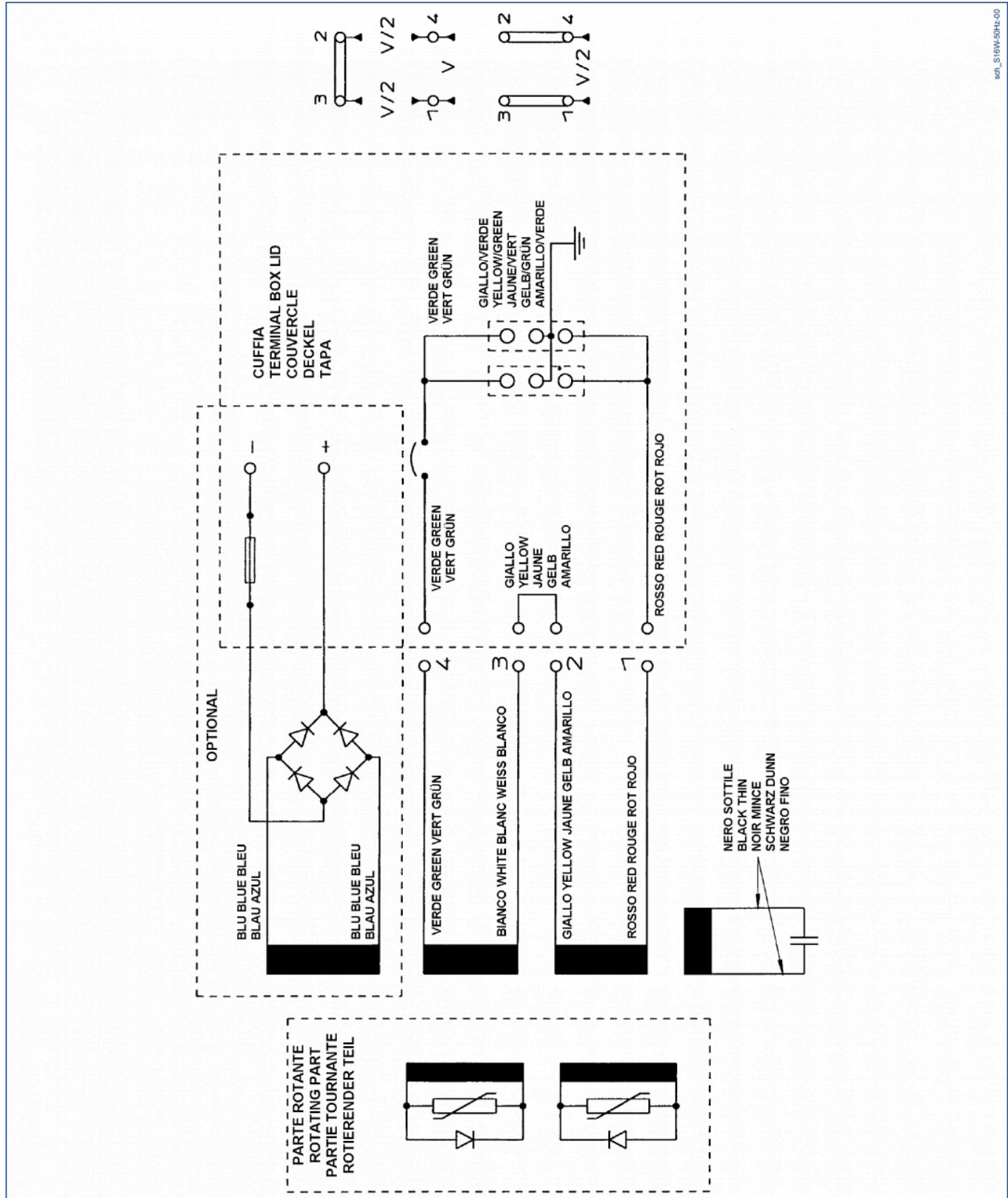
60 Hz



sch_516W-60Hz-00

10.3 Wiring diagrams S16W-HD

50 Hz



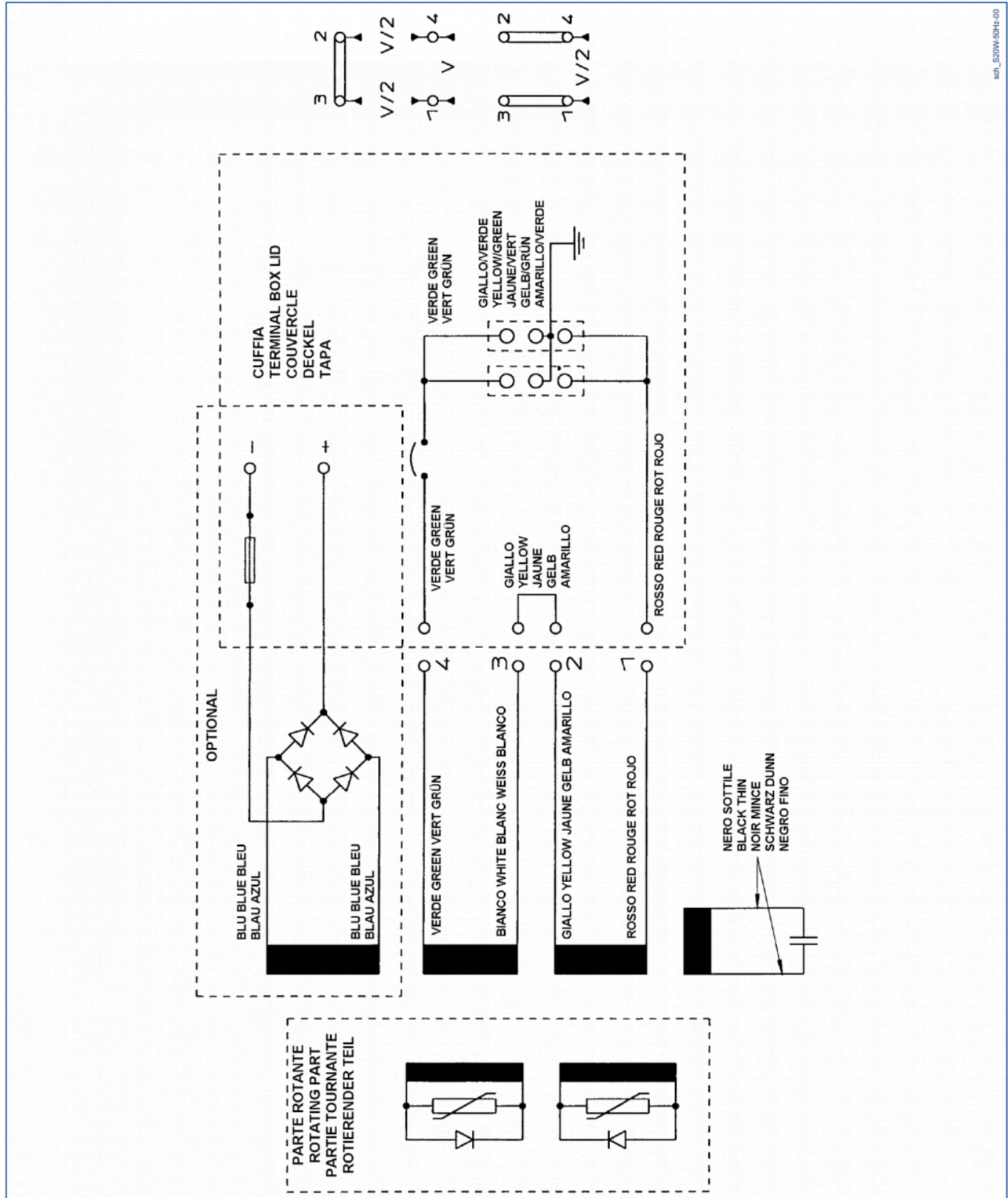
scd_S16W-50Hz-00

Sch S16VL-60Hz-00

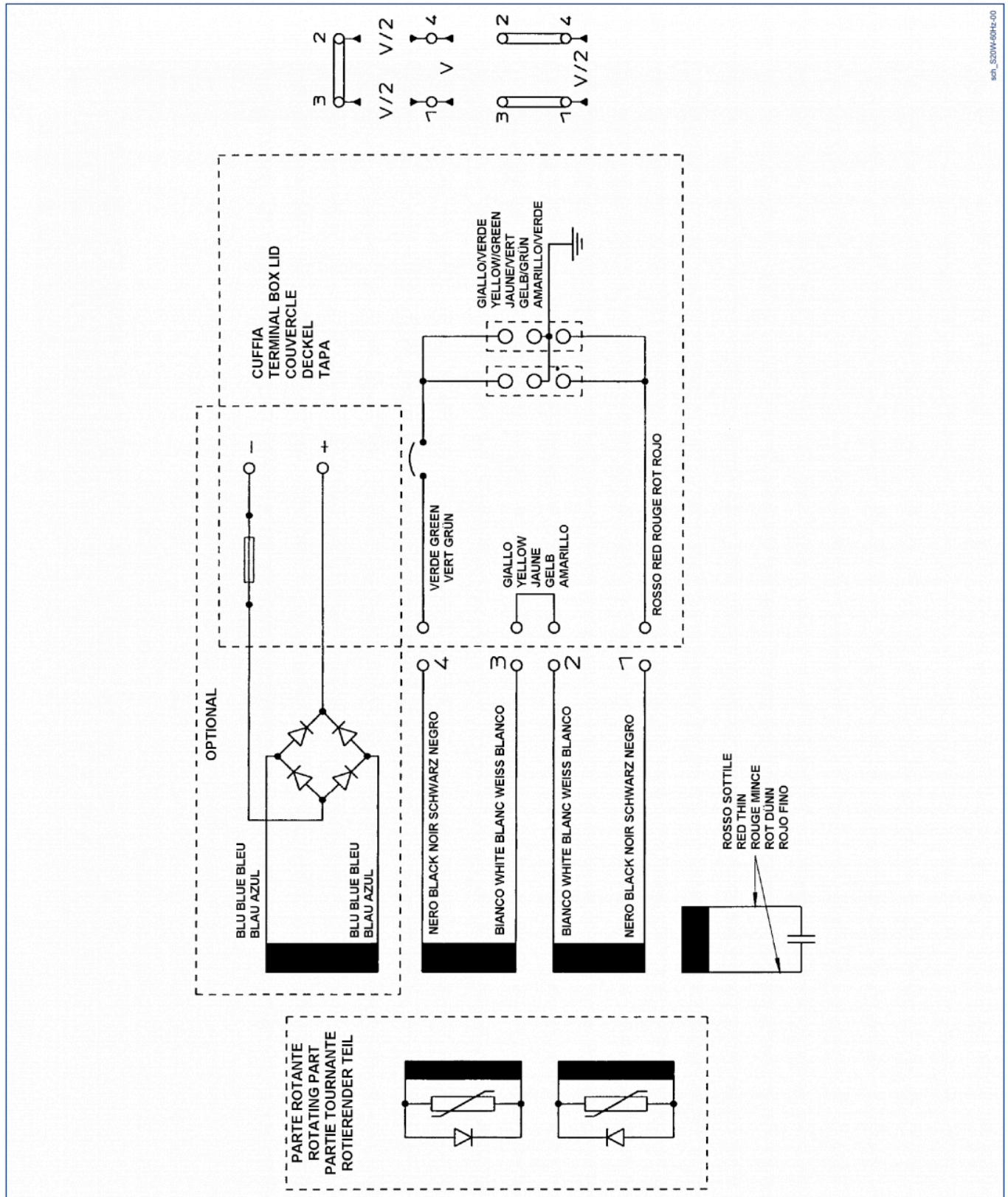


10.4 Wiring diagrams S20W

50 Hz

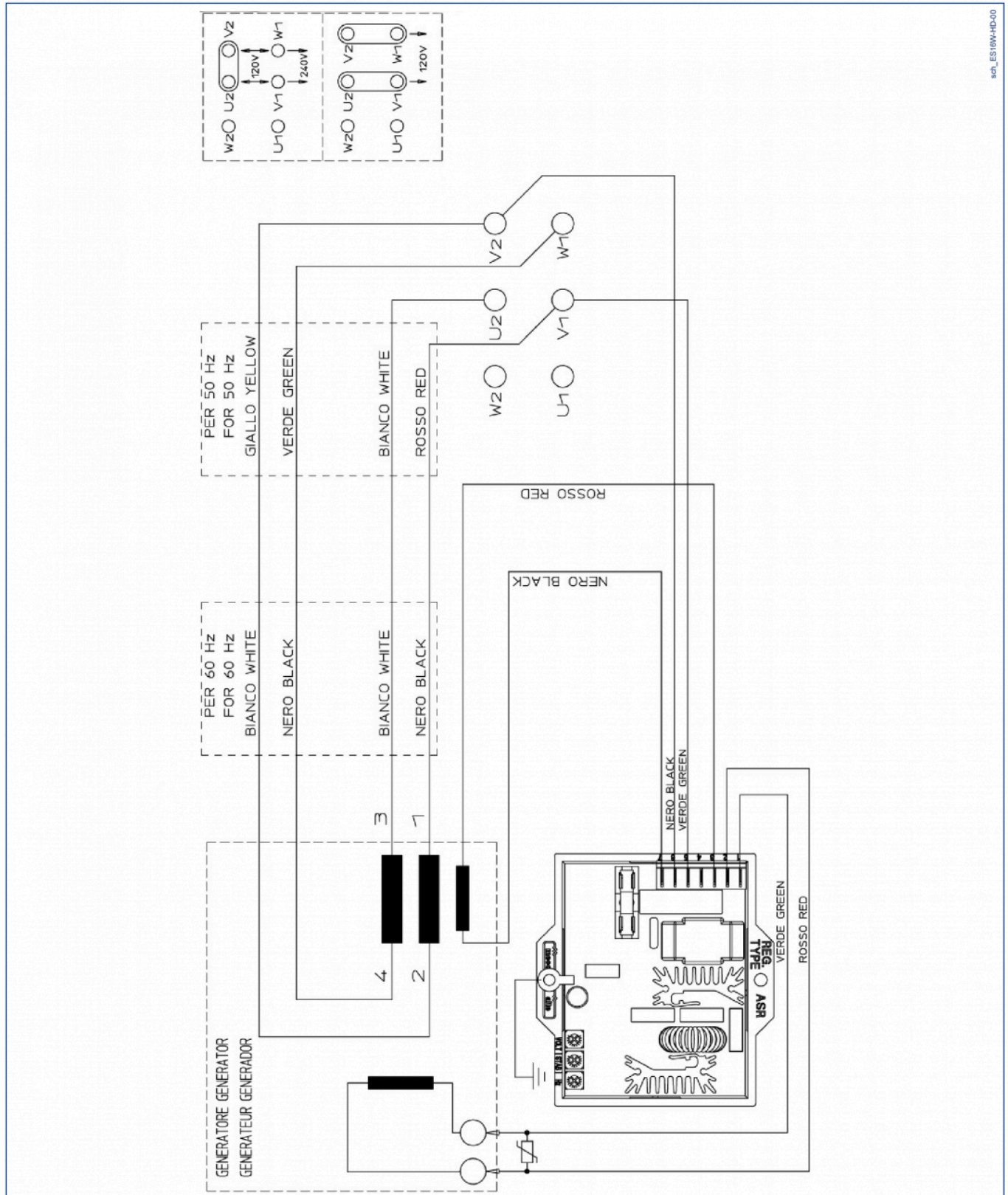


60 Hz



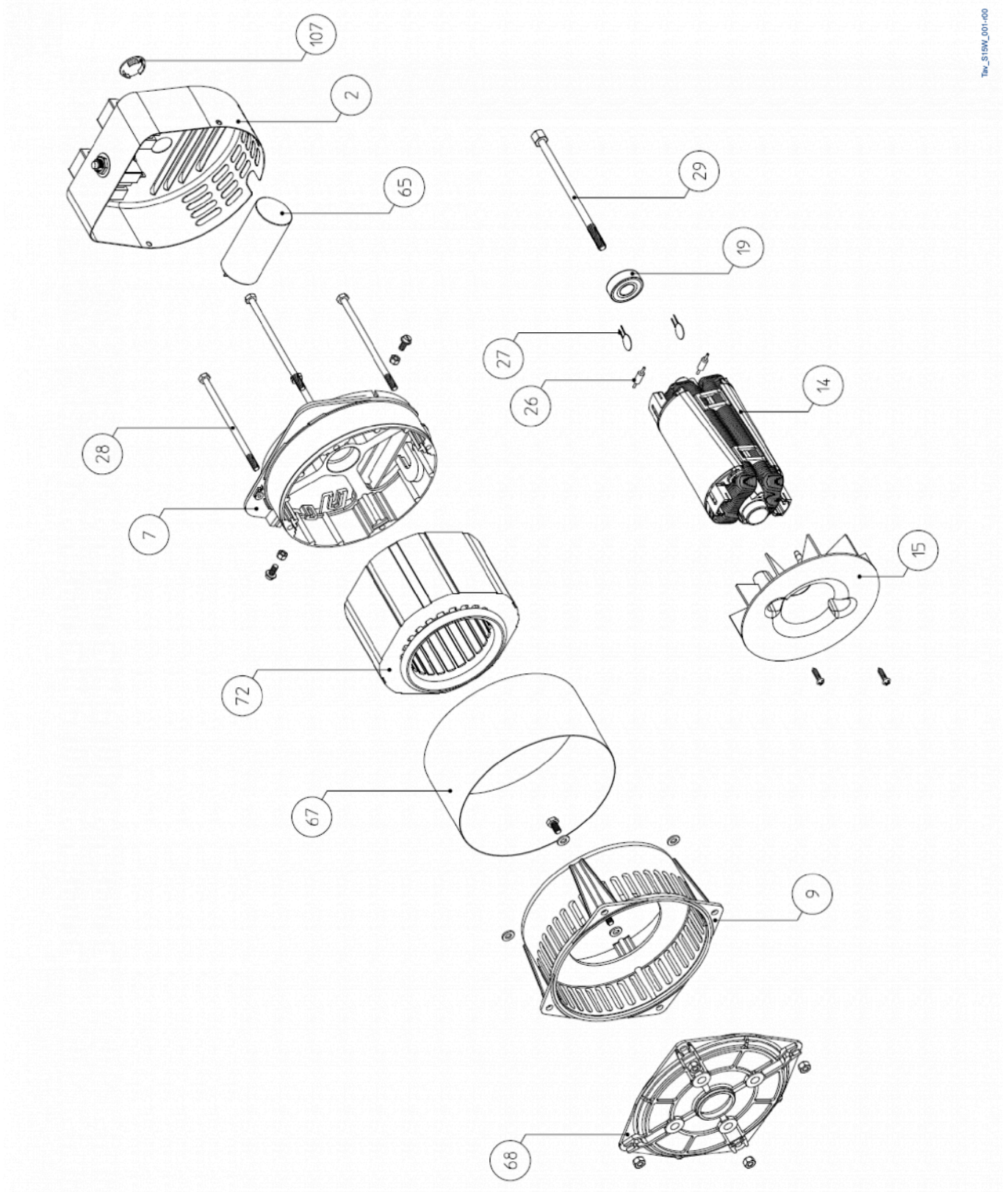
sch_S20W-60Hz-00

10.5 Wiring diagrams ES16W-HD



11 Spare parts

S15W



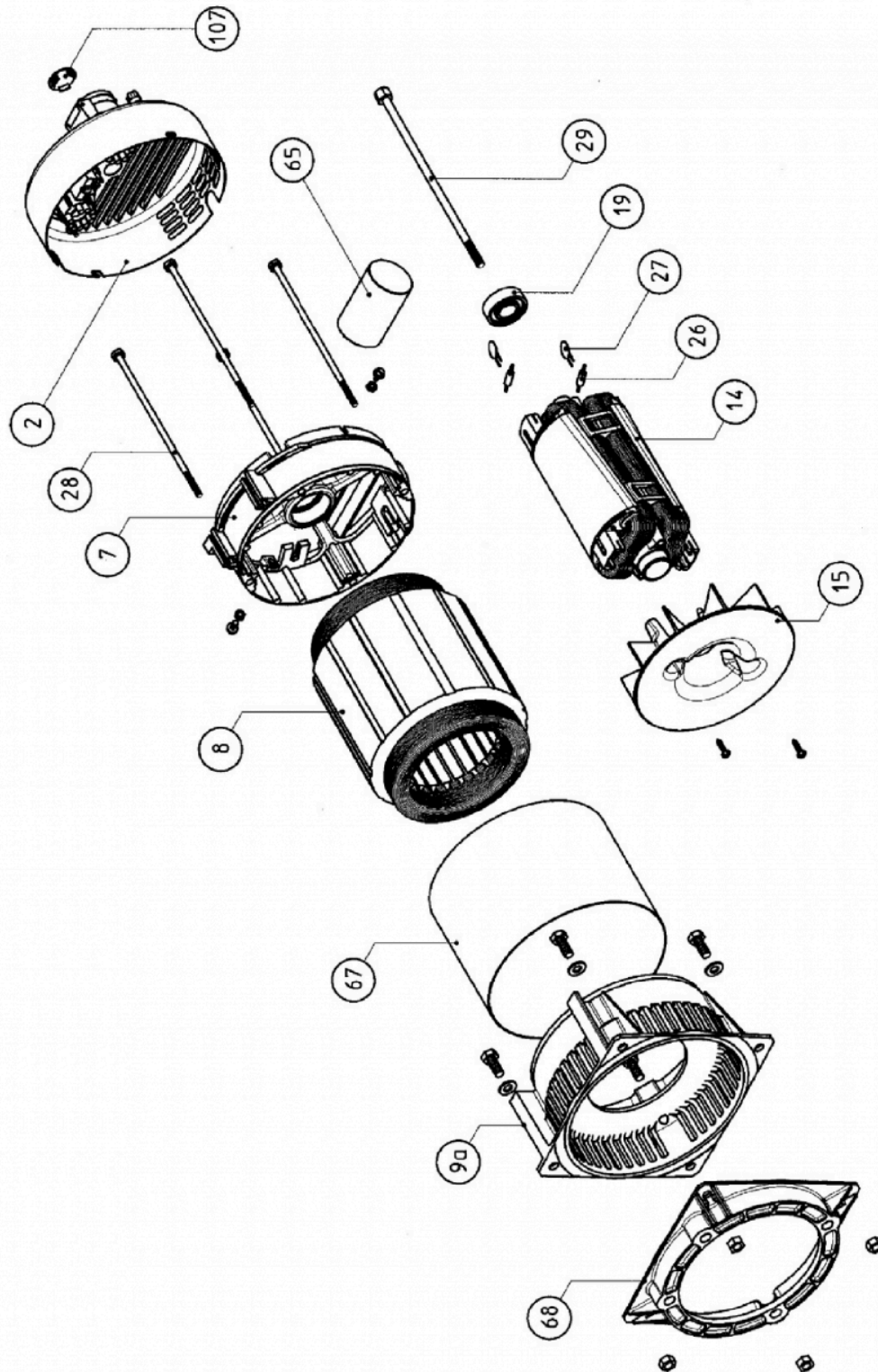
Ta_S15W_001-000

Spare parts list S15W

Item	Name	Item	Name
2	Terminal box lid	29	Securing stud
7	Back cover	65	Capacitor
9	Front Cover	67	Locking band
14	Rotating Inductor	68	Interchangeable flange
15	Fan	72	Wound stator
19	Rear bearing 6202-2RS1	103	Single-phase socket
26	Diode	107	Terminal box plug
27	Varistor	109	Breaker
28	Cover rod		

Various battery charging			
25	Rectifying bridge 1 phase	55	Fuse holder
36	Battery charger terminal, red	124	Rubber water-protection
36	Battery charger terminal, black		

S16W

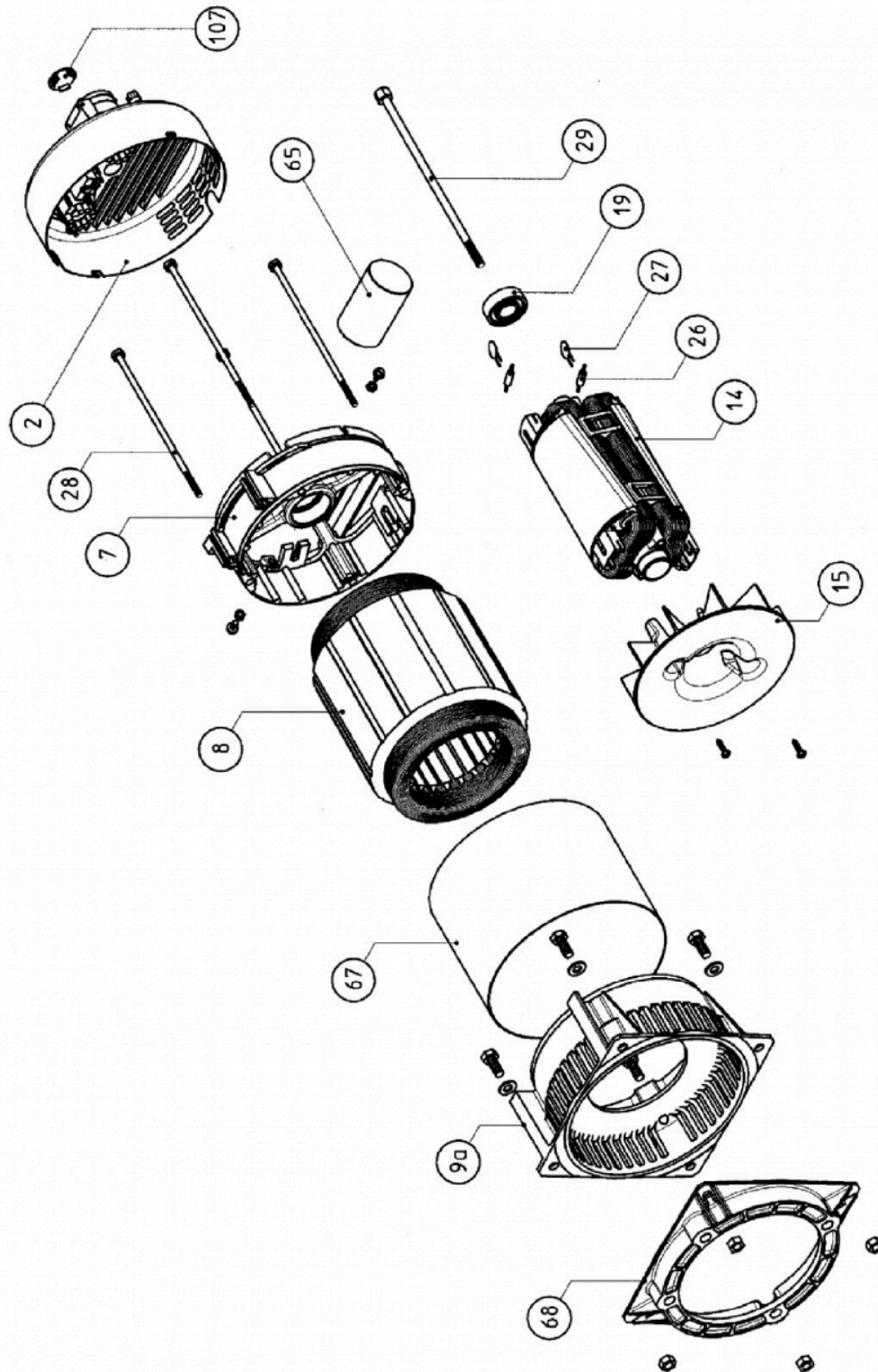


Spare parts list S16W

Item	Name	Item	Name
2	Terminal box lid	27	Varistor
7	Back cover	28	Cover rod
8	Stator	29	Securing stud
9a	Front Cover	65	Capacitor
14	Rotating Inductor	67	Locking band
15	Fan	68	Interchangeable flange
19	Rear bearing 6203-2ZC3	103	Single-phase socket
26	Diode	107	Terminal box plug

Various battery charging			
25	Rectifying single-phase bridge	55	Fuse holder
36	Battery charger terminal, red	-	Fuse
36	Battery charger terminal, black		

S16W-HD



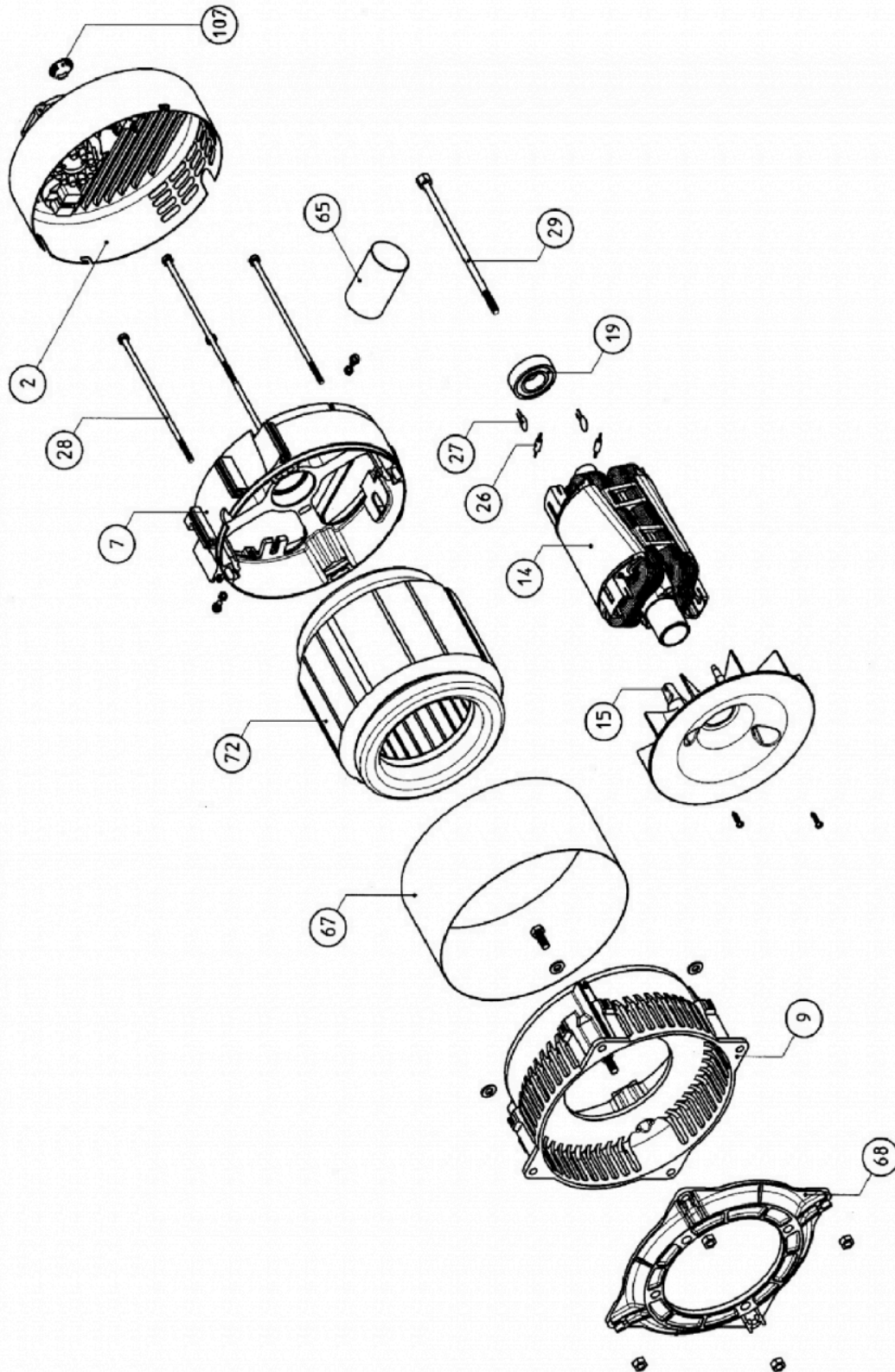
Tbw_S16W_001-000

Spare parts list S16W-HD

Item	Name	Item	Name
2	Terminal box lid	27	Varistor
7	Back cover	28	Cover rod
8	Stator	29	Securing stud
9a	Front Cover	65	Capacitor
14	Rotating Inductor	67	Locking band
15	Fan	68	Interchangeable flange
19	Rear bearing 6203-2ZC3	103	Single-phase socket
26	Diode	107	Terminal box plug

Various battery charging			
25	Rectifying single-phase bridge	55	Fuse holder
36	Battery charger terminal, red	-	Fuse
36	Battery charger terminal, black		

S20W



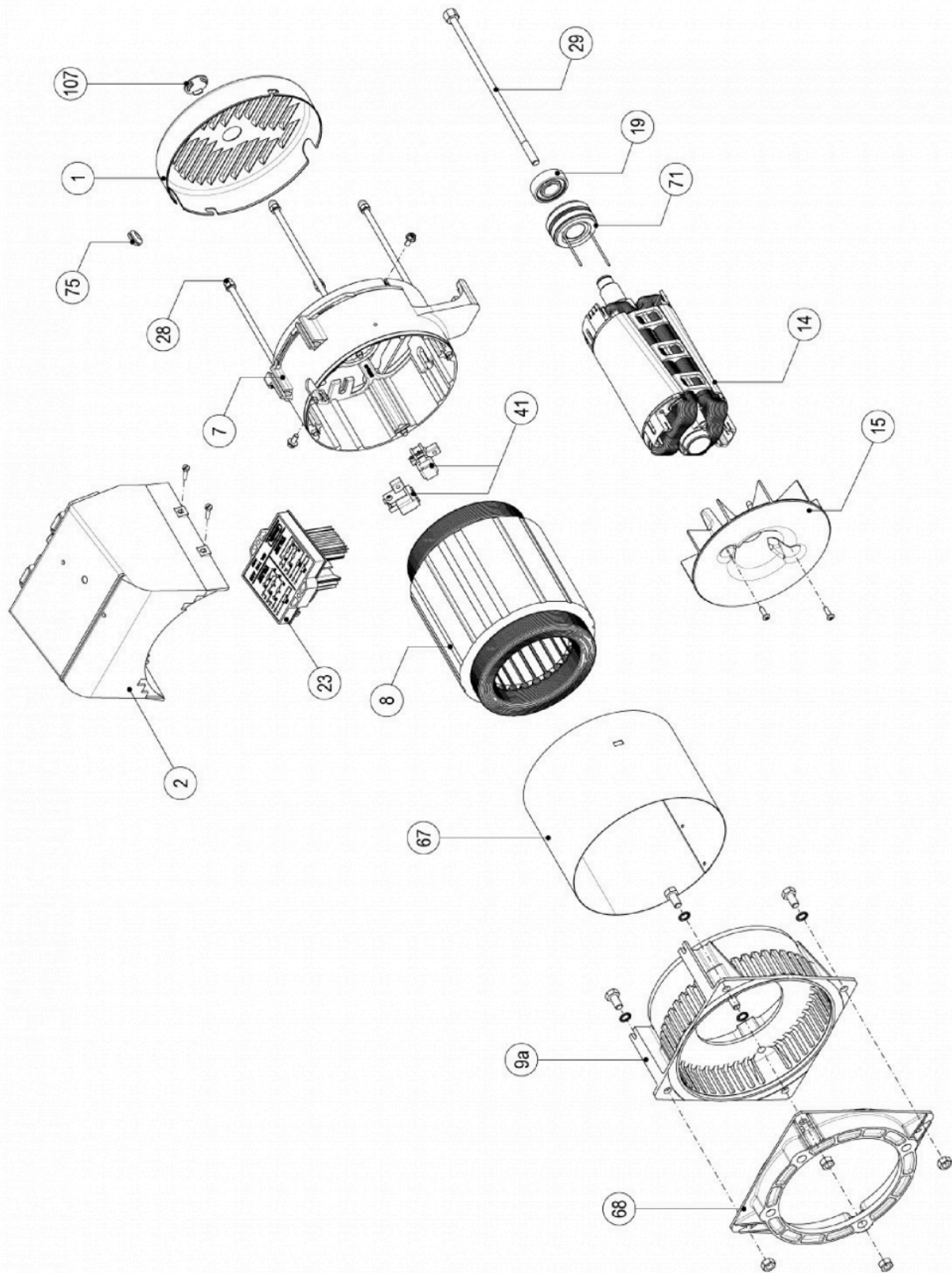
Tw_S20W_001-000

Spare parts list S20W

Item	Name	Item	Name
2	Terminal box lid	29	Securing stud
7	Back cover	65	Capacitor
9	Front Cover	67	Locking band
14	Rotating Inductor	68	Interchangeable flange
15	Fan	72	Wound stator
19	Rear bearing 6205-2RS	103	Single-phase socket
26	Diode SCD 25A1300V	107	Terminal box plug
26a	Diode P1000S 10A 1200V	109	Breaker
27	Varistor	124	Rubber water-protection
28	Cover rod		

Various battery charging			
25	Rectifying bridge 1 phase	54	Switch
36	Battery charger terminal, red	55	Fuse holder
36	Battery charger terminal, black	55	Fuse

ES16W-HD



Tav. ES16W-HD_001-000

Spare parts list ES16W-HD

Item	Name	Item	Name
1	Grid	28	Cover rod
2	Terminal box lid	29	Securing stud
7	Back cover	41	Brush gear assembly ET/ES x ASR
8	Stator	67	Locking band
9a	Front Cover	68	Interchangeable flange
14	Rotating Inductor	71	Slip ring 50x22x8
15	Fan	75	Rubber grommet
19	Rear bearing 6203-2ZC3	107	Grid rubber cap
23	ASR Electronic Regulator		

12 Disassembly and disposal

To dispose of the alternator or its components you will have to recycle it, keeping in mind the nature of its various components (for instance: metals, plastic parts, rubber, oil and so on).

You will have to designate specialized companies for this purpose and , however, observe the waste management applicable laws.



Most of the materials used in the alternators can be recycled by specialized waste management companies. The instructions contained in this chapter are recommendations to follow for environmentally sound disposal; the user has the responsibility of observing local regulations.



For indicative percentages of the materials used in Mecc Alte alternators see paragraph [2.2.2](#).

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