



# OPERATIONS & MAINTENANCE MANUAL

## ESI DESIGNED AND BUILT

Kubota DG972 Series Propane or Gasoline Engine  
Mecc Alte ECP or NPE Gen End

## APPLICABLE MODELS

KPG-06-WG97G-MR8S-GAS

KPG-06-WG97G-M1EC-GAS

KPG-06-WG97L-MR8S-LP

KPG-06-WG97L-M1EC-LP



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**Equipment Source, Inc.**



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# General Information & Warranty

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# OPERATORS MANUAL

## ESI Generator

Kubota, JCB & Isuzu Powered  
Generators by ESI

### SPECIFICATIONS

See product specification sheet for product specifications



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# 1 Introduction

**⚠ WARNING** Read and understand this manual before operating the machine to avoid serious injury or death.

## 1.1 General Description

ESI built generators come in a variety of configurations and sizes. Refer to unit specifications and manual components for specific details. General operation and maintenance remains the same for all of these units.

## 1.2 Manual Applicability

This manual is applicable to the following Equipment Source Incorporated (ESI) machine models:

Model	Description
KPG, JCB & IPG Series	Skid mounted ESI Generators
KPG, JCB & IPG Series Enclosure Series	ESI Generators with Enclosures

This manual should be kept with the machine at all times. Immediately contact Equipment Source Incorporated (manufacturer) or an authorized dealer to obtain a copy of this manual if missing or damaged. Refer to [www.equipmentsourceinc.com](http://www.equipmentsourceinc.com) for current contact information.

## 1.3 Manual Scope

This manual contains basic operating and maintenance instructions for the above listed product. For detailed service instructions concerning specific electrical or mechanical components, refer to the operation and maintenance manual provided by the manufacture of the specific component or contact an authorized service provider. Operation and Maintenance instructions for the generator controller can be found in the separate controller manual included with the generator.

## 1.4 Warranty

Review the warranty before operating or working on the unit. The warranty contains important safety and operational requirements. Contact ESI for the latest warranty information.

## 1.5 Installation

Review the installation requirements before installing, operating or working on the unit. The installation requirements contain important information and must be adhered to in order to maintain warranty. Contact ESI for the latest installation requirements.



## 2 IMPORTANT SAFETY INSTRUCTIONS

### WARNING

- SAVE THESE INSTRUCTIONS. This manual contains important instructions that should be followed during the operation and maintenance of the generator, battery and heater.

### 2.1 Training

- Never allow untrained personnel to operate or service the machine. Take time to read the manual and discuss safe practices with jobsite personnel.
- Read and understand the operating section of this manual.
- Take time to familiarize yourself with the controls and instructional placards before operating or servicing.
- Contact your dealer or service provider if additional training is necessary.

### 2.2 Operating

- Some components are hot while in operation. Keep clothing and combustibles away.
- Wear protective clothing, such as gloves, appropriate to the jobsite.
- Observe changes in the operating environment and respond accordingly.
- Generators vibrate in normal use. During and after the use of the generator, inspect the generator as well as extension cords and power supply cords connected to it for damage resulting from vibration. Have damaged items repaired or replaced as necessary. Do not use plugs or cords that show signs of damage such as broken or cracked insulation or damaged blades.

### 2.3 Service

- Only trained service technicians should attempt to service the machine.
- Properly shutdown the machine and let cool completely before attempting to service any component.
- Never defeat the safety devices
- Never modify the machine

## 3 Transporting

### 3.1 Lifting

#### CAUTION

- Ensure that any equipment used to lift the unit is rated for the weight of the unit.

### 3.2 Transporting

1. Lift the machine following the guidelines presented below.
2. If applicable: ensure all doors are closed and latched.
3. Remove any hoods in the way before lifting.
4. Lift the unit using ONLY designated lifting points or fork pockets.

### 3.3 Storage

Units placed in storage must be stored out of the elements and protected from rain, snow and sunlight. The warranty will be voided for units left exposed to the elements during storage. ESI built unit enclosures provide sufficient protection when properly closed.

#### 3.3.1 Short-Term Storage (less than 90 days)

1. Shutdown the machine
2. Close all doors (if applicable)

#### 3.3.2 Long-Term Storage (greater than 90 days)

1. Shutdown the machine
2. Verify that the main breaker and control switches are in the off position
3. Disconnect the battery
4. Drain water from fuel filters.
5. Secure/Close vents and openings (if applicable).



## 4 Operation

### 4.1 System Operation

Refer to individual component manuals for operation of those components. This unit should only be operated by trained personnel familiar with the operation of the entire system. Refer to the PRE-OPERATION CHECK portion of the Engine Manual

### 4.2 Recommended Fuels and Fueling Instructions

**⚠ CAUTION** Do not overfill tank. Tank should be filled to only 90% of the full volume to allow thermal expansion.

Use ULSD No.1 or ULSD No.2. For continuous duty operation, a refilling schedule should be established.

### 4.3 Engine Heat - 120V Power Input

If a cold start is required, use the 120V engine pre-heat circuit to warm the engine block and engine oil prior to starting. The engine should be pre-heated for approximately 4-hours if the ambient temperature is below -7°C (20°F). Longer preheat cycles may become necessary in extremely cold conditions.

Use a grounded flexible extension cord rated at 15A minimum to connect the machine to a 120V power supply. There is an orange, three-prong “Y” located on each of the generators.

### 4.4 Cold Weather Operation

ESI generators are warranted for operation down to 5 degrees Fahrenheit. Operation at colder temperatures requires an Arctic Re-Air Enclosure from ESI. Generators installed in Arctic Re-Air enclosures are warranted for operation in extreme cold. Ask the ESI sales team about Arctic Re-Air options. Operating a generator below 5 degrees Fahrenheit will void all manufacturers warranties.

## 4.5 Monitoring and Operation

### 4.5.1 Minimum Loading of Diesel Engines

Diesel generator engines require that a minimum average load be maintained. An average load of 75% of the rated output of the generator must be maintained to avoid damaging the unit (often referred to as “Wet-Stacking”). Prolonged use of the generator at loads less than 75% of rated output will void the warranty, reduce the life span of the engine and cause damage to the unit. Refer to the ESI Warranty Summary for further details. Consider using a load bank to maintain minimum loading on the engine.

### 4.5.2 Daily Inspection & Startup Inspection (required)

- Conduct general inspection of the unit
- Listen for abnormal sounds
- Check fluid levels
- Check all hoses for damage (including but not limited to fuel lines and coolant lines)
- Check engine temperature
- Check containment for accumulation of liquids.
- Check vents for icing or other obstructions (if applicable)
- Observe recommended maintenance schedule
- Check for error codes on control units for KPG and any other equipment associated with the unit.

## 4.6 Long Run Oil Tank (LRT)

- An LRT equipped ESI generator has increased service intervals up to 3000 hours
  - Oil change intervals should be determined using an oil sample analysis at regular intervals to determine maximum service interval.
  - Operating conditions may affect the service interval of the LRT.
- The service interval of the LRT may change if operating conditions change
- Prefill oil filters with oil when completing an oil change on a LRT equipped unit. This reduces the likelihood of damaging air bubbles in the oil system.
- Users can expect some oil seeping between engine base and long run oil pan on LRT installations. This is a normal condition for operating the LRT and is not warrantable.
- Great care should be taken to limit vibration of the generator. Excessive vibration will cause premature failure of LRT seals and is not warrantable. See warranty and installation instructions for further details.

#### 4.7 EPA Tier 4 Final Rural Alaska Exemption

The EPA allows for the sale of Tier 3 generators for certain applications for use in Rural Alaska. If you have purchased a Tier 3 generator under the EPA exemption, the following requirements must be met at all times. Failure to adhere to these requirements will void all warranties and will result in legal and financial liability for the customer.

The EPA Tier 4 Final Rural Alaska Exemption allows for engines certified under EPA Tier 3 standards to be used for non-emergency applications in “Remote Areas of Alaska”.

Definition of “Remote Areas of Alaska” (according to §60.4219, “Remote Areas of Alaska” means areas of Alaska that meet paragraph (1) or (2) below):

1. Areas of Alaska that are not accessible by the Federal Aid Highway System (FAHS)
2. Areas of Alaska that meet ALL of the following criteria:
  - a. The only connection to the FAHS is through the Alaska Marine Highway System, or the stationary CI ICE (Compression Ignition Internal Combustion Engine) operation is within an isolated grid in Alaska that is not connected to the statewide electrical grid referred to as the Alaska Rail belt Grid.
  - b. At least 10 percent of the power generated by the stationary CI ICE on an annual basis is used for residential purposes.
  - c. The generating capacity of the source is less than 12 megawatts, or the stationary CI ICE is used exclusively for backup power for renewable energy

Customer is required to maintain and protect EPA or Emission Control Information labels on the engine for the life of the engine. Failure to do so will constitute failure to adhere to the requirements of the EPA Tier 4 Final Rural Alaska Exemption.

Customer agrees to indemnify ESI against, and hold ESI harmless from, any claims which may be made against ESI as a result of the EPA Tier 4 Final Rural Alaska Exemption. Customer consents to these conditions and agrees to pay in full for all legal fees, fines or other costs associated with improper application of the EPA Tier 4 Final Rural Alaska Exemption.

## 5 Maintenance

**⚠ CAUTION**

Some of the following maintenance operations should only be completed by a trained technician. Do not attempt to open electrical panels unless you are a trained technician. Maintenance schedule must be adhered to and documented in order to maintain warranty. Maintenance programs should be tailored to the specific generator, environment and operating conditions.

**5.1 Maintenance Schedule**

**Table 1. Maintenance Schedule**

Interval	Maintenance Instruction	Notes
Daily	<ul style="list-style-type: none"> <li>▪ See section 4.4.2 of this manual for additional requirements</li> </ul>	Complete at every inspection
Every 50 hours	<ul style="list-style-type: none"> <li>▪ Check of fuel pipes and clamp bands</li> <li>▪ Check radiator hoses and clamp bands</li> <li>▪ Drain water separator</li> </ul>	
Varies by model	<p>Engine Oil Change and Oil Replacement Intervals</p> <ul style="list-style-type: none"> <li>▪ Standard Oil Pan (Kubota Recommendation)                             <ul style="list-style-type: none"> <li>○ Initial Oil Change: 50 hours</li> <li>○ Interval:                                     <ul style="list-style-type: none"> <li>▪ KPG-05: 100 hours</li> <li>▪ KPG-20-T4F, KPG-30-T4F, &amp;</li> <li>▪ KPG-06 to KPG-24 &amp;</li> <li>▪ Spark Ignition: 200 hours</li> <li>▪ KPG-28 &amp; KPG-36: 250 hours</li> <li>▪ KPG-45, IPG-08, IPG-13, &amp;</li> <li>▪ IPG-55: 500 hours</li> </ul> </li> </ul> </li> <li>▪ Long Run Oil Pan (LRT) Option                             <ul style="list-style-type: none"> <li>○ Interval: 3,000 hours</li> </ul> </li> </ul>	<p>Engine oil must meet API Spec: CF, CF-4, CG-4, CH-4 or CI-4</p> <p>See section 4.5 for additional notes on LRT oil changes.</p>
Every 200 hours (KPG-05 to KPG-24) <b>OR</b> Every 250 hours (IPG-08, IPG-13, IPG-44, KPG-20-T4F, KPG-30-T4F, & KPG-28 to KPG-45)	<ul style="list-style-type: none"> <li>▪ Clean air cleaner element</li> <li>▪ Change Engine Oil and Oil Filter (KPG-06 to KPG-36)</li> <li>▪ Check and clean fuel filter</li> <li>▪ Check battery electrolyte level</li> <li>▪ Check fan belt tightness</li> <li>▪ Check intake air line</li> <li>▪ Inspect generator (see generator section of this manual)</li> </ul>	
Every 500 hours	<ul style="list-style-type: none"> <li>▪ Change Engine Oil and Oil Filter Cartridge (IPG-Series, KPG-45, standard oil pan)</li> <li>▪ Replace fuel filter cartridge</li> <li>▪ Remove sediment in fuel tank</li> <li>▪ Clean water jacket (radiator interior)</li> <li>▪ Replace fan belt</li> <li>▪ Clean water separator</li> </ul>	
Every one or two months	<ul style="list-style-type: none"> <li>▪ Charge battery as needed</li> </ul>	
Every Year	<ul style="list-style-type: none"> <li>▪ Replace air cleaner element</li> <li>▪ Clean Generator (blow out with air) and inspect</li> <li>▪ Change Engine Oil and Oil Filter</li> </ul>	Air filter element may need cleaning more frequently depending on environmental conditions



Every 800 hours	<ul style="list-style-type: none"> <li>▪ Check valve clearance</li> </ul>	
Every 1500 hours	<ul style="list-style-type: none"> <li>▪ Check fuel injectors</li> </ul>	
Every 3000 hours	<ul style="list-style-type: none"> <li>▪ Change Engine Oil and Oil Filter Cartridge (diesel units equipped with LRT)</li> <li>▪ Check turbo charge (if unit is equipped with a turbo)</li> <li>▪ Check supply pump</li> </ul>	
Every 5000 hours	<ul style="list-style-type: none"> <li>▪ Change Engine Oil and Oil Filter Cartridge (spark ignition units equipped with LRT)</li> </ul>	
Every Two Years	<ul style="list-style-type: none"> <li>▪ Change radiator coolant</li> <li>▪ Replace battery</li> <li>▪ Replace radiator hoses and clamp bands</li> <li>▪ Replace fuel pipes and clamp bands</li> <li>▪ Replace intake air line</li> <li>▪ Replace fan belt (or every 500 hours, whichever occurs first)</li> </ul>	
Every 10,000 hours / 2 years	<ul style="list-style-type: none"> <li>▪ Inspect Generator sealed bearings</li> </ul>	
At 30,000 hours	<ul style="list-style-type: none"> <li>▪ Replace Generator sealed bearings</li> </ul>	

**5.2 Engine Service**

Use engine operator’s or service manual provided for further instruction on how to complete routine service or trouble shooting.

**5.3 Battery Service**

The engine starting circuit is supplied by a single 12V battery. No maintenance is required other than normal charging and occasional replacement.

To replace the battery, sequentially remove the negative ground lead, positive power lead and the bracket holding the battery in the tray. Replace the battery by securing in the tray, connecting the positive lead and then connecting the ground lead.



## 6 Maintenance Records

**Table 2. Machine Data**

<b>Machine Serial Number</b>	
<b>Engine Serial Number</b>	
<b>Generator Serial Number</b>	

**Table 3. Maintenance Records**

<ul style="list-style-type: none"> <li>▪ Date</li> <li>▪ Engine Hours</li> <li>▪ Service Personnel</li> <li>▪ Service Location</li> </ul>	<p style="text-align: center;"><b>Description of work completed</b></p>
















## Commonly Replaced ESI Generator Parts

See next page for LRT options and remote fuel filters when applicable

Engine Series	Model	Kubota Engine	Oil Filter	Air Filter	Fuel Filter	Oil Capacity
Engine Series	KPG-05-Z48	Z482	15426-32430	K1211-82320	12581-43012	2.6 Liters / 0.69 Gal
	KPG-06-NG	DG972	HH150-32430	1G659-11222	N/A	3.4 Liters / 0.90 Gal
	KPG-06-LP	WG972				3.4 Liters / 0.90 Gal
05 Series	KPG-06-MQ	D1005	HH160-32093	15741-11083	15221-43170	5.1 Liter / 1.35 Gal
	KPG-06-D10	D1005				5.1 Liter / 1.35 Gal
	KPG-08-D11	D1105				5.1 Liters / 1.35 Gal
	KPG-10-D13	D1305				5.7 Liters / 1.50 Gal
	KPG-12-V15	V1505				5.7 Liters / 1.50 Gal
03 Series	KPG-14-D15	D1503	HH164-32430	70000-11081	HH166-43560	7.0 Liters / 1.85 Gal
	KPG-15-V17	D1703				7.0 Liters / 1.85 Gal
	KPG-18-V20	V2003				9.5 Liters / 2.50 Gal
	KPG-20-V22	V2203				9.5 Liters / 2.50 Gal
	KPG-23-V20T	V2003-T				9.5 Liters / 2.50 Gal
	KPG-24-V24	V2403				9.5 Liters / 2.50 Gal
V3 Series	KPG-28-V33	V3300	HH1C0-32430	3A111-19130 (inner) 59800-26110 (outer)	HH166-43560 & R60S	13.2 Liters / 3.50 Gal
	KPG-36-V36	V3600		R2401-42280 (inner) 59700-26112 (outer)		
	KPG-36-V38D	V3800-derated				
	KPG-45-V38	V3800				
T4F	KPG-20-D18-T4F	D1803-T4F				
	KPG-30-V24-T4F	V2403-T4F				
	Model	Engine	Oil Filter	Air Filter	Fuel Filter	Oil Capacity
Isuzu	IPG-08-3CH	3CH1NGZG1	5-8640-0632-0	K1211-82320	5-8640-0778-0 & R12s	3.4 Liters / 3.6 Qt
	IPG-13-3CE	3CE1UGZG1	5-8640-1515-0	K1211-82320	5-8640-1510-0 & R12s	6.7 Liters / 7.1 Qt
JCB	JPG-50-444	444 T4A-55				

**Service Intervals:** Air Filters: Yearly or 500 hours (more frequently may be needed) | Fuel Filters: 500 hours

**Clean Water Separator:** ALL: 500 hours

**Oil & Oil Filter Service Intervals:** ALL: Initial @ 50hrs

KPG-05: 100 hrs | 05 & 03 Series: 200 hrs | IPG-08, IPG-13, KPG-28 & KPG-36: 250 hrs

KPG-45: 500 hrs | All LRT Models: 3,000 hrs | KPG-20-T4F, KPG-30-T4F: XXX hrs

JPG-50: 500 hrs

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## Long Run Oil Option (LRT)

Replaces standard oil filter and oil capacity from chart above for units with LRT installed

Model	LRT Model	LRT Size	Oil Filter (2ea.)	Oil Capacity
KPG-06 to KPG-12	05SMLRT	9 Gallon	16121-32430	32 Quarts / 8 Gal
KPG-06 to KPG-12	05LRT	19 Gallon		48 Quarts / 12 Gal
KPG-15 to KPG-24	03LRT	19 Gallon		48 Quarts / 12 Gal
KPG-28 to KPG-45	V3LRT	26 Gallon		64 Quarts / 16 Gal
KPG-20-T4F & KPG-30-T4F	03-4-LRT	19 Gallon		48 Quarts / 12 Gal
IPG-08	3CH1LRT	19 Gallon		48 Quarts / 12 Gal
IPG-13	3CE1LRT	19 Gallon		48 Quarts / 12 Gal
JPG-50	444LRT	26 Gallon		64 Quarts / 16 Gal

## Remote Racor Fuel Filter

In addition to fuel filters from above chart for units with auxiliary Racor Fuel filter installed.

Model	Filter Part Number
120AS Racor Fuel Filter	R12S
660R2 Racor Fuel Filter	R60T (10 micron)

Part numbers may vary for non-standard products. Always have unit Stock # available when calling for parts. Consult the O&M Manual for additional details.

## Engine Coolant Capacities

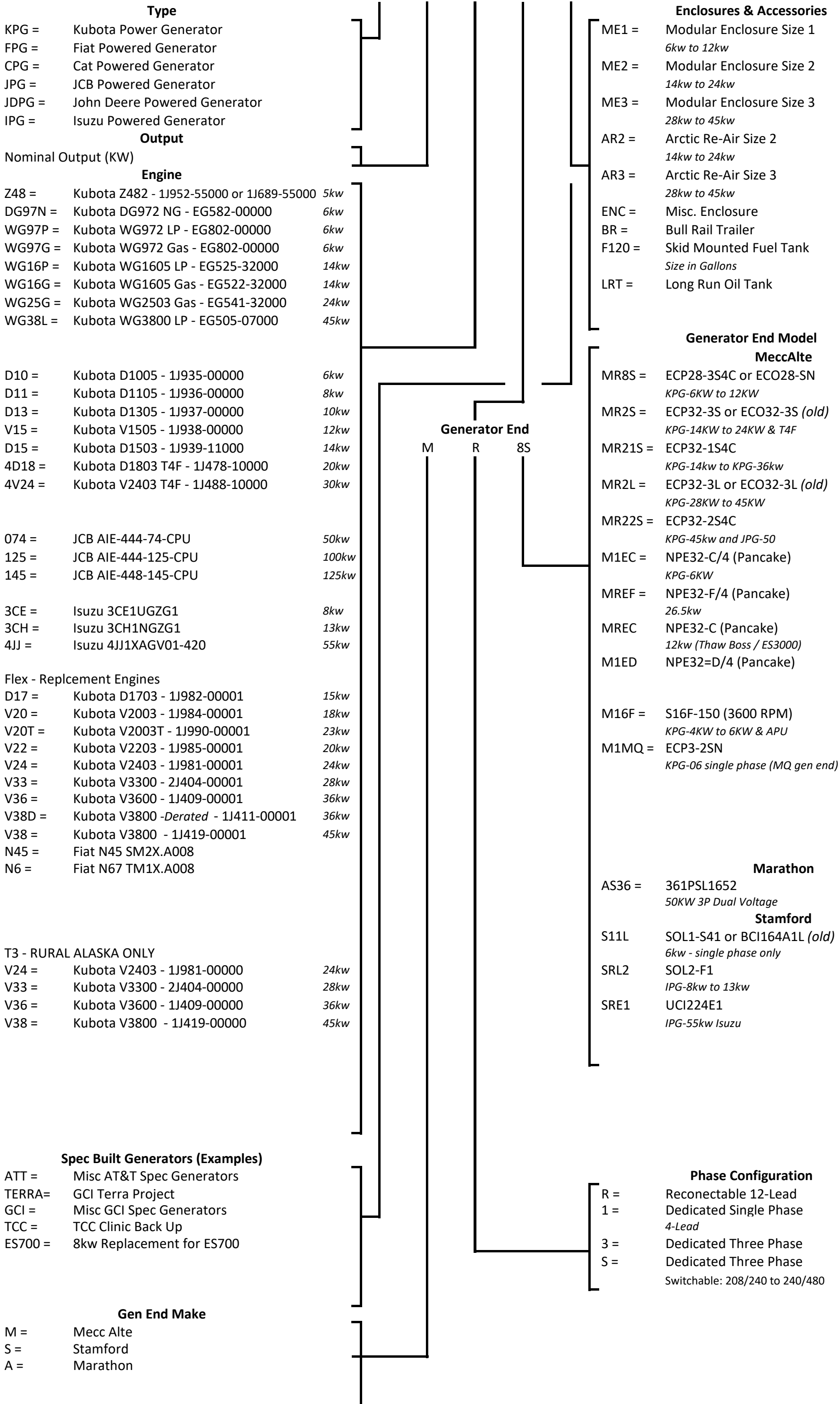
Always check fluid levels after filling. Coolant capacities are approximate

Gen Model	Engine Model	Radiator Model	Volume
KPG-06	Kubota D1005	A65	4 quarts
KPG-08	Kubota D1105	RAD2	4 quarts
KPG-10	Kubota D1305	RAD2	4.5 quarts
KPG-12	Kubota V1505	RAD4	6 quarts
KPG-14 / 15	Kubota D1503 / D1703	RAD3	8 quarts
KPG-18 / 20 / 24	Kubota 03 Series	RAD3	9 quarts
KPG-28 / 36 / 45	Kubota V3 Series	RADH	14.5 quarts
KPG-20-T4F	Kubota D1803 T4F		
KPG-30-T4F	Kubota V2403 T4F		
IPG-08	Isuzu 3CH1NGZG1		
IPG-13	Isuzu 3CE1UGZG1		
JPG-50	JCB 444 T4A-55		

# KPG Model Breakdown

## ESI Generators

KPG - 18 - V20 - MR8S - AR2



**WARRANTY****EQUIPMENT SOURCE INC.  
LIMITED WARRANTY****INFORMATION**

Equipment Source Inc. (ESI) warrant to you, the original purchaser, that all parts (except those 3<sup>rd</sup> party components listed below) of your new ESI product purchased from an Authorized ESI Distributer or from ESI directly will be free from defects in materials or workmanship for 1 (one) year/2,000 hours (whichever occurs first) from invoice date. Additional component warranties are listed below.

Summary of major component warranties (see component sections of this manual for further details and additional warranties). Warranty periods are from invoice date. Not all of the following components are applicable to every product. All warranty time periods begin at invoice date:

1. Engine – 2 (two) years / 2,000 hours, whichever occurs first (please refer to the Isuzu or Kubota Engine Warranty sheet enclosed in this manual for details).
2. Generator and Controls – Free from defects in materials or workmanship for 1 (one) year / 2,000 hours.
3. Flagro Heater / Fire Box - 1 (one) year / 2,000 hours
4. ESI Manufactured Firebox– free from defects in materials or workmanship for 3 (three).
5. Pump – 1 (one) year (please refer to the pump warranty sheet enclosed in this manual), wear parts are not covered under warranty.
6. Buderus Boiler – 2 (two) years limited warranty, please refer to Buderus warranty sheet enclosed in this manual.

In order to obtain warranty repairs, you must deliver the product, at your expense, together with proof of purchase to 1919 Van Horn Road, Fairbanks, AK 99701 (907.458.9049) or 7780 Old Seward Highway, Anchorage, AK 99518 (907.341.2250). Call 907.458.9049 from outside Alaska. Offsite warranty may be performed if customer pays all travel and shipping expenses.

No person, agent or dealer is authorized to give any warranties on the behalf of ESI, nor is to assume for this company any other liability in connection with any of ESI's products unless made in writing and signed by an officer of ESI. This warranty supersedes and is in leu of all other warranties, expressed or implied including terms and

conditions of Purchase Orders. The company must be notified within 5 (five) business days, in writing of any product failure and warranty claim.

**WHAT THE WARRANTY DOES NOT COVER**

This warranty **does not** cover:

1. Damage, malfunction or failures resulting from accidents, abuse, misuse, modifications, alteration, improper servicing or lack of performance of required maintenance service voids the warranty including but not limited to regularly scheduled oil changes and filter changes.
2. Damage, malfunction or failures resulting from underloading of the engine (also known as wet stacking) voids the warranty. Refer to the Operations and Maintenance manual for proper engine loading requirements.
3. Normal maintenance services or replacement of maintenance items such as light bulbs, preheater plugs, heater nozzles, filter elements, lubricants, oils, coolant, belts, tires, or other wear items.
4. This warranty does not cover cosmetic damage.
5. 3<sup>rd</sup> party parts installed on ESI products. Unauthorized modifications to the unit will void the warranty and may impair function.
6. Failure of or damage caused by ancillary systems. These include but are not limited to failures of the fuel or oil system (not provided by ESI), HVAC system, building / structure or other systems.
7. Units placed in storage must be stored out of the elements and protected from rain, snow and sunlight. The warranty will be voided for units left exposed to the elements during storage. ESI built unit enclosures provide sufficient protection when properly closed.
8. Improperly installed products. Operating the unit on or in the packing pallet or crate or improperly mounted skid generator (including installation of isolators between the skid and mounting surface) voids the warranty. Consult the product operator's manual for required installation procedures.
9. Installation of electrical components by anyone other than a licensed electrician voids the warranty.

10. Use of the unit for application other than what the product was meant for voids the warranty.
11. Warranty coverage expires whenever the client, for whatever reason, is late in payment.
12. The warranty does not cover repairs or modifications for small oil weeps on Long Run Oil Tanks (if installed). A small amounting of weeping during break in and use is expected and does not warrant repairs.

#### **LIMITATION ON ESI's RESPONSIBILITY**

Our responsibility for any and all losses and damages resulting from any cause whatsoever, including our negligence, alleged damage or defective goods, whether such defects are discoverable or latent, shall be limited to the repair or replacement of defective parts. IN NO EVENT WILL ESI BE LIABLE FOR LOSS OF USE, LOSS OF PROFITS, LOSS OF OR DAMAGE TO OTHER PROPERTY, INCONVENIENCE, COMMERCIAL LOSS, ENVIRONMENTAL CLEANUP OR OTHER SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES WHATSOEVER. ESI will in no event be liable for fuel, oil, coolant or other spills or cleanup regardless of cause or fault. Proper containment and monitoring is the sole responsibility of the end user. In no event shall ESI's liability ever exceed the purchase price of the specific unit in questions.

#### **MONITORING REQUIREMENTS**

Frequent monitoring of equipment is vital for proper operation and maintenance of the equipment. All equipment must be monitored daily by trained technicians (or more frequently if indicated in the Operation Manual). Monitoring can be achieved via electronic monitoring systems for remote installations (unless otherwise noted in the Operation Manual). The following unit conditions must be monitored on a daily basis, failure to do so will void all warranties. Additional monitoring may be required depending on site specific requirements.

- General inspection of unit to include: inspection for leaks, damage to unit, improper operation, malfunctioning equipment, error codes or other issues.
- Inspect coolant level and condition. Add coolant as needed to maintain proper coolant levels. Replace coolant if coolant condition has degraded.
- Inspect oil level and condition. Add oil as needed to maintain proper oil levels. Replace oil at recommended service intervals or if oil is found to have degraded.

- Inspect Engine temperature and engine speed.
- Inspect containment, check for leaks and presence of fluids in containment

Maintenance logs must be maintained for the unit and provided to ESI for warranty claims. ESI offers monitoring equipment for electronic monitoring.

#### **OPERATION & SAFETY REQUIREMENTS**

Failure to adhere to these requirements will void all warranties.

- Read and understand carefully all components of the Operator's Manual prior to starting or operating the unit.
- Learn how to operate and work safely. Know your equipment and its limitations. Always keep the engine in good condition.
- Do not carry out maintenance on a running or hot unit. Keep hands away from moving parts.
- Do not climb on top of the unit to perform work of any kind.
- When lifting the unit, ensure that the lifting device is rated for the unit weight. Only lift the unit with provided lifting rings or fork pockets.
- In case of emergency, shut off the engine and notify the person in responsible charge.
- Follow all applicable laws and regulations regarding operation and maintenance of the unit.
- For Trailer Mounted Units:
  - Ensure that the trailer is registered with an applicable transport authority before towing.
  - Complete a thorough walk around inspection of the unit before towing. Inspect for damage or abnormalities and repair as needed before travel.
  - Disconnect the trailer from the tow vehicle, place wheel chocks behind the wheels and level prior to running or operating the unit.
- Refer to the various component sections of the Operator's Manual for proper maintenance and service intervals.

Failure to adhere to any of the above requirements or the requirements of Installation Instructions or Operations and Maintenance Manual will void all warranties. ESI reserves the right to update or modify this warranty at time. Contact ESI for a current warranty.



**KUBOTA ENGINE AMERICA CORPORATION  
LIMITED WARRANTY ON INDUSTRIAL ENGINES  
AND REPLACEMENT PARTS EFFECTIVE JANUARY 1, 2009**

**OUR WARRANTY TO YOU**

We warrant to you, the original purchaser, that all parts (except those referred to below) of your new Kubota industrial engine and replacement parts purchased from an Authorized Kubota Industrial Engine Distributor or OEM Distributor in the United States will be free from defects in materials or workmanship during the following periods.

1. Industrial Engines for 2 years or 2,000 hours, whichever occurs first.
2. Industrial Engines Major Component Warranty (MCW), 3 years or 3000 hours, whichever occurs first, parts only.

**MCW covers** cylinder block, cylinder head, crankshaft, camshaft, gears, pistons, rods, flywheel, flywheel housing, oil pump, pulleys, governor, intake manifold, oil pan, ignition distributor.

**MCW does not cover** rings, bearings, water pump, any electrical component, valve train components, accessory parts, seals, gaskets, carburetors, exhaust manifold, hoses, all fuel system components, muffler, any filters, radiator, fan, belts, thermostat, spark plugs, fuel transfer pumps.

3. Replacement parts for 1 year.

**WHAT WE WILL DO**

We will, at our option, repair or replace any part covered by this warranty which becomes defective, malfunctions or otherwise fails to conform with this warranty under normal use and service during the term of the warranty at no charge for parts or labor. (Parts only for MCW)

**WHAT YOU MUST DO TO OBTAIN WARRANTY SERVICE**

In order to obtain warranty repairs, you must deliver the product, together with proof of purchase, to an Authorized Kubota Industrial Engine Distributor or Dealer at your expense. The names and addresses of such Authorized Kubota Industrial Engine Distributors can be found on the internet at [www.kubotaengine.com](http://www.kubotaengine.com), by calling 1-800-532-9808 or by contacting:

Kubota Engine America Corporation  
505 Schelter Road  
Lincolnshire, IL 60069

**WHAT THE WARRANTY DOES NOT COVER**

This warranty **does not** cover:

1. Damage, malfunctions or failures resulting from accidents, abuse, misuse, modifications, alteration, improper servicing, or lack of performance of required maintenance service.
2. Normal maintenance services or replacement of maintenance items such as light bulbs, preheater plugs, indicator and resistant coils, filter elements, lubricants, oils, spark plugs, coolant, or belts.
3. Installation of replacement parts, unless originally installed by an Authorized Kubota Industrial Engine Distributor or Dealer.
4. Non-genuine Kubota parts.
5. Any engines damaged by use of ether or any starting aid, or greater than a 50/50% solution of antifreeze and water.
6. Injection nozzle wear or any engine damage caused by injection nozzle wear or sticking.
7. Damage caused by water entering the engine due to any cause.
8. Used Products.
9. Any damage caused by overheating that is not a direct result of a defect in materials or workmanship.
10. Any Engine not application reviewed.

engine installation to optimize functionality/performance within the OEM's equipment in order to maintain durability, customer satisfaction, and reduce warranty failures and expenses. Kubota cannot anticipate all potential failures and issues that may occur with the engine or product in the field during an application review. Therefore, machine durability testing by the OEM either in a test facility and/or in the field is critical to further reduce the potential for field failures.

The amount of time spent by KEA on an application review is significantly less than the amount of time spent by the OEM's design engineers on the application. Because of this, the KEA application review is intended to identify issues that are within the scope of the application review testing performed and in some cases recommend possible solutions. The KEA application review should never take the place of proper design and testing of the finished product by the OEM.

The KEA application review does not in any way express or imply any additional warranty coverage other than what is stated in Kubota's Limited Warranty Agreement. Kubota and its subsidiary companies are not responsible for (including, but not limited to): failures resulting from any components that are not manufactured by Kubota, misrepresented or incorrect information provided from an OEM, any changes made without KEA's knowledge, any decision by the OEM not to follow KEA's recommendations, or any application related problems or deficiencies that may arise that were not found by KEA's limited application review or the OEM's durability testing.

**THIS IS THE ONLY EXPRESS WARRANTY ON OUR PRODUCTS**

We neither assume nor authorize anyone to assume for us any other express warranty. The Kubota Distributor/ Dealer has no authority to make any representation or promise on behalf of Kubota Engine America Corporation or to modify the terms or limitations of this warranty in any way.

**LIMITATIONS ON OUR RESPONSIBILITY WITH RESPECT TO PRODUCTS PURCHASED AND USED FOR PERSONAL, FAMILY OR HOUSEHOLD USE.**

Our responsibility is to repair or replace defective parts as stated above. We will not be responsible for any other expenses, losses or inconvenience which you may sustain as a result of the purchase, use, malfunction or defective condition of our products. ANY IMPLIED WARRANTIES INCLUDING WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE SHALL BE LIMITED IN DURATION TO THE PERIOD SET FORTH ABOVE AND IN NO EVENT WILL WE BE LIABLE FOR ANY SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES WHATSOEVER. Some states do not allow limitations on how long an implied warranty lasts or the exclusion or limitation of incidental or consequential damages, so the above limitations or exclusions may not apply to you. This warranty gives you specific legal rights, and you may have other rights which vary from state to state.

**LIMITATIONS ON OUR RESPONSIBILITY WITH RESPECT TO PRODUCTS USED FOR RENTAL OR FOR COMMERCIAL, INDUSTRIAL OR AGRICULTURAL PURPOSES.**

This warranty is in lieu of all other warranties, express or implied, and of any other obligations or liability on our part. IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE ARE EXCLUDED. Our responsibility for any and all losses and damages resulting from any cause whatsoever, including our negligence, alleged damage or defective goods, whether such defects are discoverable or latent, shall be limited to the repair or replacement of defective parts as stated above. IN NO EVENT WILL WE BE LIABLE FOR LOSS OF USE, LOSS OF PROFITS, LOSS OF OR DAMAGE TO OTHER PROPERTY, INCONVENIENCE, COMMERCIAL LOSS, OR OTHER SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES WHATSOEVER.

**APPLICATION REVIEW PROCESS:** The Kubota Engine America (KEA) application review process is intended to assist the OEM with





## INSTALLATION REQUIREMENTS FOR ESI OPEN SKID GENERATORS KPG, IPG, FPG AND ALL OTHER SERIES GENERATORS

The installation and commissioning of a generator is never a Plug n Play event. Proper professional review is always needed for proper operation, personal safety and to maintain warranty. All applicable codes and laws must be adhered to for proper installation.

All electrical connections must be reviewed and confirmed at the time of installation by a licensed electrician. Compatibility and configurations of system components such as but not limited to: generator, fuel systems, enclosures, switchbox, controllers and service panels must be reviewed by a qualified professional at the point of installation. All wires and hoses must have protection from chaffing as needed. An adequate and safe 12v power, fuel supply and exhaust must be provided.

Proper installation of the skid mounted generator must include a solid platform for support. The skid must be secured to prevent the unit from walking and to prevent excess vibration. The generator must be removed from the shipping pallet, crate or other shipping materials for proper installation. The open skid generator is provided with isolator mounts between the engine/genset and skid. The mass of the skid is not adequate to provide vibration isolation for the supported components without proper installation. The installation of additional isolators between the skid and mounting surface will create excess vibration and voids all warranties.

The skid must be securely attached to a concrete floor, metal structure or reinforced wooden floor designed for the application and load. All installations must be reviewed by a professional shortly after commissioning to ensure compliance with these installation requirements.

ESI highly recommends that skid mounted generators be installed with adequate fluid containment and other safeties including but not limited to remote monitoring. The installer and operator of the generator must adhere to all laws and regulations governing the installation and operation of the generator. The installer and operator must follow industry best practices where they meet or exceed the requirements laid in these instructions, the Warranty Summary or the Operations and Maintenance Manual.

Improper installation or failure to adhere to these instructions will void the warranty, may promote the risk of injury and reduce the useful life of the unit. See Warranty Summary and Operations and Maintenance Manual for further details and requirements.

Contact ESI for the latest Installation Requirements, Warranty Summary or Operations and Maintenance Manual.

### Anchorage:

7780 Old Seward Hwy  
Anchorage, AK 99518  
(907) 341-2250 | (877) 341-2250

### Fairbanks:

1919 Van Horn Road  
Fairbanks, AK 99701  
(907) 458-9049 | (888) 868-9049

### Seattle:

17660 W. Valley Hwy  
Tukwilla, WA 98188  
(425) 251-6119

### Williston:

5064 Bennett Loop  
Williston, ND 58801  
(701) 774-5312



ESlAlaska.com

# Alternator Manual

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Williston, ND 58801  
(701) 774-5312



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I

**ALTERNATORI AUTOREGOLATI SERIE ECO-ECP**

ISTRUZIONI PER L'USO E LA MANUTENZIONE

GB

**SELF-REGULATING ALTERNATORS SERIES ECO-ECP**

OPERATING AND MAINTENANCE INSTRUCTIONS

F

**ALTERNATEURS AUTO - REGULES SERIE ECO-ECP**

MANUEL D'INSTRUCTION ET DE MAINTENANCE

D

**SELBSTREGELNDER GENERATOR SERIE ECO-ECP**

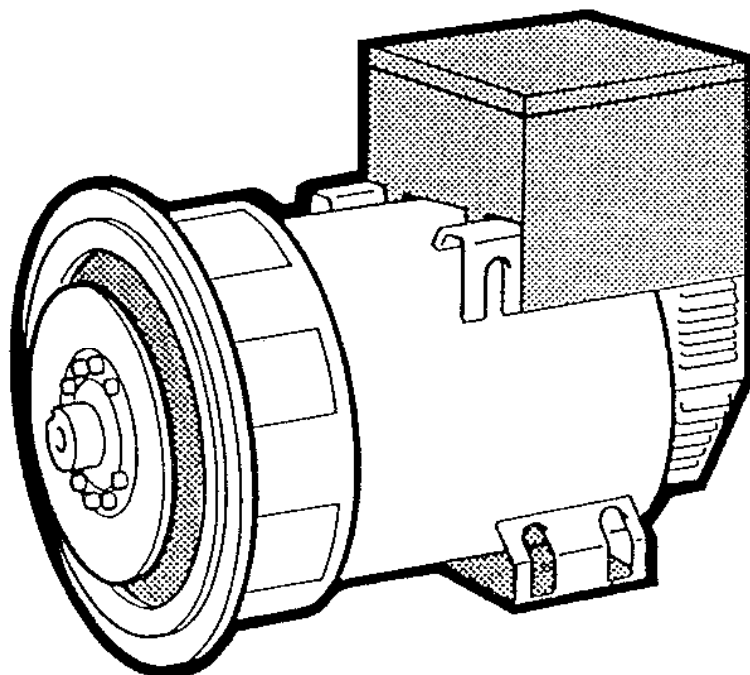
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E

**ALTERNADORES AUTOREGULADOS SERIE ECO-ECP**

INSTRUCCIONES PARA USO Y MANTENIMIENTO

CE



ECO

ECP



CALUS<sup>®</sup>  
INSULATION SYSTEM

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DESCRIZIONE MACCHINA	MACHINE DESCRIPTION
-------------------------	------------------------

I generatori della serie ECO-ECP sono autoregolati, brushless a 2 e 4 poli. Hanno induttore rotante provvisto di gabbia di smorzamento e indotto fisso a cave inclinate. Gli avvolgimenti sono a passo raccorciato per ridurre il contenuto armonico.

I generatori sono costruiti in conformità alle direttive CEE 2006/42, 2006/95, 2004/108 e relative modifiche, alle norme CEI 2-3, EN 60034-1, IEC 34-1, VDE 0530, BS4999-5000, CAN/CSA-C22.2 N°14 - N°100.

Le prove per la verifica della compatibilità elettromagnetica sono state eseguite nelle condizioni prescritte dalle norme, con il neutro collegato a terra.

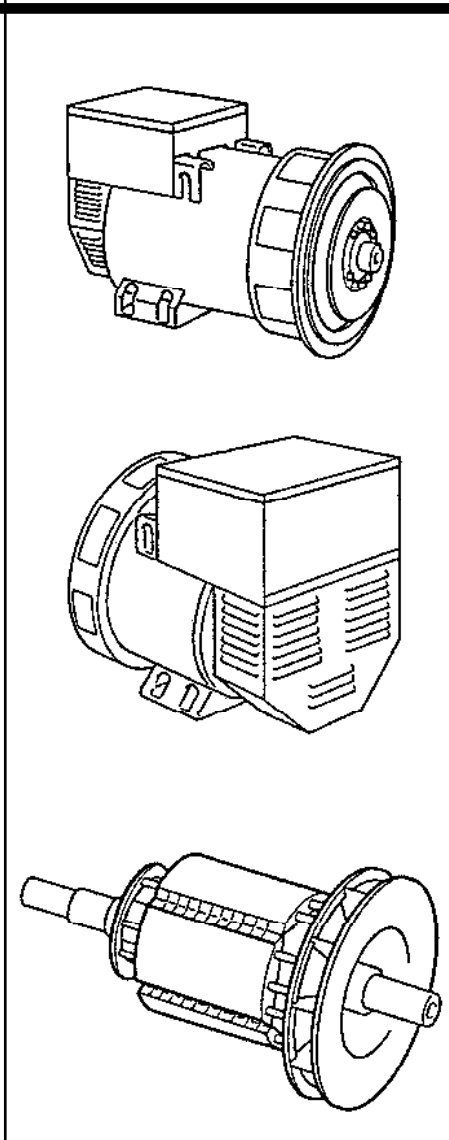
Esecuzioni in accordo ad altre specifiche possono essere eseguite su richiesta del cliente.

La struttura meccanica, sempre molto robusta, consente un facile accesso ai collegamenti e permette di eseguire le verifiche nelle diverse parti altrettanto facilmente.

La carcassa e' realizzata in acciaio, gli scudi in ghisa, l'albero in acciaio C45 con ventola calettata.

Il grado di protezione e' IP21 (a richiesta e' possibile realizzare un grado di protezione superiore).

Gli isolamenti sono eseguiti in classe H, le impregnazioni con resine epossidiche per le parti rotanti e trattamenti sottovuoto per le parti di piu' elevata tensione, quali gli statori (a richiesta trattamenti speciali).



ECO-ECP 2 and 4 pole alternators are brushless, self-regulating and incorporate a rotating inductor with damper cage winding and a fixed stator with skewed slots. The stator windings have a shortened pitch to reduce the harmonic content of the output waveform.

The alternators are made in compliance with the 2006/42, 2006/95, 2004/108 CEE directives and their amendments, and the CEI 2-3, EN 60034-1, IEC 34-1, VDE 0530, BS4999-5000, CAN/CSA-C22.2 N°14 -N°100 regulations.

Tests to verify the electromagnetic compability have been carried out in the foreseen conditions by the standards with the neutral connected to the earth.

On customer's request alternators can be manufactured according to different specifications.

The robust mechanical construction gives good access to the generator output connections, and allows the user to inspect the various components with ease.

The casing is made of steel, the shields of cast iron, and the shaft of C45 steel and it has a keyed fan.

The mechanical protection level meets standard IP21 (upon request higher levels of protection can be supplied).

Insulation materials meet Class H requirements, and all rotating components are epossy resins impregnated; higher voltage parts, such as the stators, are vacuum-treated (special treatments are available on request).

## PREMESSA

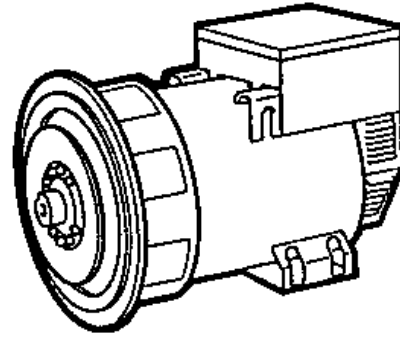
I generatori della serie ECO-ECP, rispondono alle direttive CEE 2006/42, 2006/95, 2004/108 e relative modifiche; pertanto non presentano pericolo per l'operatore, se installati, usati, mantenuti secondo le istruzioni fornite dalla Mecc Alte e a condizione che i dispositivi di sicurezza siano tenuti in perfetta efficienza.

Per questa ragione occorre attenersi scrupolosamente alle istruzioni indicate in questo manuale.

E' vietata qualsiasi riproduzione di questo manuale.

## IDENTIFICAZIONE MACCHINA

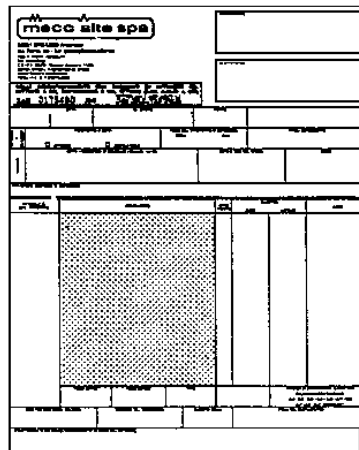
Per qualsiasi comunicazione con la Mecc Alte o con i centri di assistenza autorizzati, citare sempre il tipo e il codice del generatore.



Mecc Alte spa		Via Rome n. 80 - 36091 Tel. 0444/996111-E. A. CREAZZO VIGENZA ITALIA Fax 0444/206166		CE	
TYPE	ESD 40-137	IP	0000222220	PHASE	3
KVA	400	490	COSPHI	D.B.	ING. CL. N
R.P.M.	1800	1800	IP	40/50	
V	115/200/230/400			138/240/276/480	
A	200B/1155/1004/977				AMBIENT TEMPERATURE 40°C
CONNECTION	TT/ST/TS			IP	21
SERV.	V.CMCC	39.0	I.CMCC	3.66	
KG	1024	J	5.45	ODD.	E00A019
CAPACITAZIONE				DATE	1999
6318 2RST					
INC. NETHERLANDS P/B 12 124 10 28700 ALTERNATORE AUTOMOBILIAuto SELF REGULATED ALTERNATOR ALTERNATEUR AUTOMOBILE EX 620549 027 5C7 - TEL. 02/93 - TEL. 02/93 - 02/93-2419 - 02/93-1114					

## VERIFICA ALLA CONSEGNA

Alla consegna del generatore controllare con la bolla di accompagnamento che non ci siano danni o parti mancanti; nel caso informare immediatamente lo spedizionere, l'assicurazione, il rivenditore o la Mecc Alte.



## PRESCRIZIONI DI SICUREZZA

Prima di qualsiasi intervento di pulizia, lubrificazione o manutenzione assicurarsi che il motore primario a cui e' collegato il generatore non sia in funzione, ma fermo e isolato dalle sue fonti di energia.

Per fermare il generatore occorre seguire scrupolosamente la procedura di arresto del sistema di trascinamento; il generatore non e' previsto di Stop/Emergenza, ma si arresta istantaneamente in relazione al sistema di arresto predisposto dall'installatore.



## INTRODUCTION

The ECO-ECP alternators comply with the EEC 2006/42, 2006/95, 2004/108 directives and their amendments; therefore they pose no danger to the operator if they are installed, used and maintained according to the instructions given by Mecc Alte and provided the safety devices are kept in perfect working conditions.

Therefore a strict observance of these instructions is required.

Any reproduction of this manual is forbidden.

## MACHINE IDENTIFICATION

Always indicate the generator type and code when contacting Mecc Alte or the authorized after-sales service centres.

## INSPECTION ON DELIVERY

When the alternator is delivered, check that unit conforms with the delivery note and ensure that there are no damaged or defective parts; should there be any, please inform the forwarding agent, the insurance company, the seller or Mecc Alte immediately.

## SAFETY REQUIREMENTS

Before any cleaning, lubrication or maintenance operation, ensure that the generator is stationary and disconnected from the power supply.

When stopping the generator, ensure the compliance with the procedures for stopping the prime mover.  
The generator, in fact, has no Emergency Stop, but is controlled by the device arranged by the installer.

## PRESCRIZIONI DI SICUREZZA

Durante la consultazione del presente manuale d'uso e manutenzione troverete alcuni simboli; questi hanno un preciso significato qui di seguito illustrato.

### SIMBOLOGIA CONVENZIONALE E SUA DEFINIZIONE

#### IMPORTANTE

Segnala al personale interessato che l'operazione descritta presenta un rischio che può avere come conseguenza un danno alla macchina, se non effettuata nel rispetto delle normative di sicurezza.

#### ACCORTEZZA

Segnala al personale interessato che l'operazione descritta presenta un rischio che può avere come conseguenza un danno alla macchina e/o lesioni al personale stesso, se non effettuata nel rispetto delle normative di sicurezza.

#### AVVERTIMENTO

Segnala al personale interessato che l'operazione descritta presenta un rischio che può avere come conseguenza lesioni gravi o morte, se non effettuata nel rispetto delle normative di sicurezza.

#### PERICOLO

Segnala al personale interessato che l'operazione descritta presenta un rischio immediato che ha come conseguenza lesioni gravi o morte, se non effettuata nel rispetto delle normative di sicurezza.

IMPORTANTE  
IMPORTANT  
WICHTIG



## SAFETY REQUIREMENTS

In consulting this use and maintenance manual, you will find several symbols, which have a specific meaning, as illustrated below.

### CONVENTIONAL SYMBOLS AND SYMBOL DESCRIPTION

#### IMPORTANT

This symbol warns the personnel concerned that the described operation may cause damages to the machine if it is not carried out according to the safety standards.

#### CAUTION

This symbol warns the personnel concerned that the described operation may cause damages to the machine and/or injures to the personnel if it is not carried out according to the safety standards.

#### WARNING

This symbol warns the personnel concerned that the described operation may cause serious injuries or death to the personnel if it is not carried out according to the safety standards.

#### DANGER

This symbol warns the personnel concerned that the described operation may immediately cause serious injuries or death to the personnel if it is not carried out according to the safety standards.

## PRESCRIZIONI DI SICUREZZA

### ADDETTO ALLA MOVIMENTAZIONE

Identifica il tipo di operatore a cui è riservato l'intervento trattato.

Questa qualifica presuppone una piena conoscenza e comprensione delle informazioni contenute nel manuale d'uso del costruttore oltre che competenze specifiche dei mezzi di sollevamento, dei metodi e delle caratteristiche d'imbragatura e della movimentazione in sicurezza.



### MANUTENTORE MECCANICO

Identifica il tipo di operatore a cui è riservato l'intervento trattato.

Questa qualifica presuppone una piena conoscenza e comprensione delle informazioni contenute nel manuale d'uso del costruttore oltre che competenza specifica per effettuare gli interventi di installazione, regolazione, manutenzione, pulizia e/o riparazione.



### MANUTENTORE ELETTRICO

Identifica il tipo di operatore a cui è riservato l'intervento trattato.

Questa qualifica presuppone una piena conoscenza e comprensione delle informazioni contenute nel manuale d'uso del costruttore oltre che competenza specifica per gli interventi di natura elettrica di collegamento, regolazione, manutenzione e/o riparazione.

**E' in grado di operare in presenza di tensione all'interno di armadi e quadri elettrici.**



## SAFETY REQUIREMENTS

### HANDLER

This symbol identifies the type of operator in charge of the operation described.

This qualification requires a complete knowledge and understanding of the information contained in the manufacturer's instruction manual as well as specific skills about the hoisting means, slinging methods and features and safe handling procedures.

### MECHANICAL SERVICE MAN

This symbol identifies the type of operator in charge of the operation described.

This qualification requires a complete knowledge and understanding of the information contained in the manufacturer's instruction manual as well as specific skills necessary to perform installation, adjustment, maintenance, cleaning and/or repair operations.

### ELECTRICAL SERVICE MAN

This symbol identifies the type of operator in charge of the operation described.

This qualification requires a complete knowledge and understanding of the information contained in the manufacturer's instruction manual as well as specific skills necessary to perform electrical operations such as connections, adjustment, maintenance and/or repair.

**The electrical service man must be able to work even in case electrical cabinets and panels are live.**

Nel caso di interventi straordinari e su autorizzazione scritta del servizio assistenza rivolgersi ai centri autorizzati Mecc Alte.

In case of exceptional operations and upon written request of servicing operations please apply to Mecc Alte authorized centers.



## PRESCRIZIONI DI SICUREZZA

Al momento dell'installazione le norme prevedono che il generatore sia collegato a terra.

Per questa ragione assicurarsi che l'impianto di messa a terra sia efficiente ed in conformità con le direttive del paese dove il generatore sarà installato.

### ATTENZIONE

**L'INSTALLATORE FINALE È RESPONSABILE DELLA PREDISPOSIZIONE DI TUTTE LE PROTEZIONI (DISPOSITIVI DI SEZIONAMENTO, PROTEZIONI CONTRO I CONTATTI DIRETTI E INDIRETTI, PROTEZIONI CONTRO SOVRACORRENTI E SOVRATENSIONI, ARRESTO DI EMERGENZA ECC.) NECESSARIE PER RENDERE CONFORME IL MACCHINARIO E L'IMPIANTO UTILIZZATORE, ALLE VIGENTI NORME DI SICUREZZA INTERNAZIONALI/EUROPEE.**

Per la movimentazione dei generatori disimballati usare sempre ed esclusivamente gli appositi golfari.

Utilizzare funi di portata adeguata senza sollevare il generatore troppo dal pavimento (max 30 cm.).

Alla fine del periodo di vita della macchina, rivolgersi alle agenzie di smaltimento materiali ferrosi e non disperdere parti nell'ambiente.

Gli addetti all'installazione, conduzione e manutenzione del generatore devono essere tecnici adeguatamente qualificati e che conoscano le caratteristiche dei generatori.

Le persone addette alla movimentazione devono sempre indossare guanti da lavoro e scarpe antinfortunistiche.

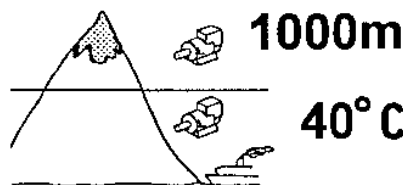
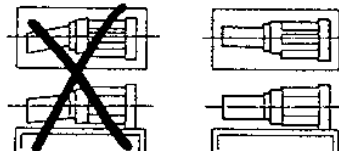
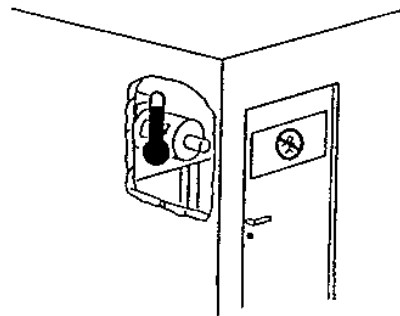
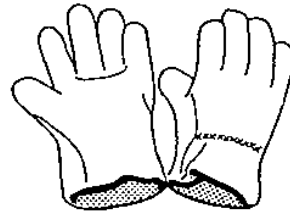
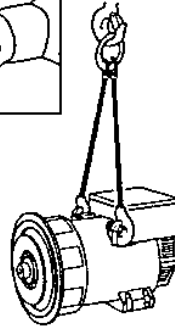
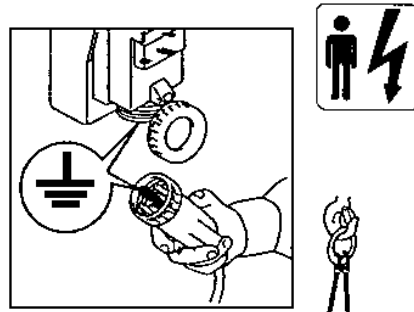
Qualora il generatore o l'intero impianto debba essere sollevato da terra, gli operatori devono usare un casco protettivo.

Il generatore va installato in un ambiente aerato. Se non c'è sufficiente aria oltre al mal funzionamento esiste pericolo di surriscaldamento (tab. 25 pag. 73). Sulla porta di ingresso del locale ci deve essere un cartello indicante il divieto di accesso alle persone non autorizzate.

Assicurarsi che il basamento del generatore e del motore primario sia calcolato per sopportare il peso e tutti gli eventuali sforzi dovuti al funzionamento.

È responsabilità dell'installatore il corretto accoppiamento del generatore al motore, mettendo in atto tutti quegli accorgimenti necessari per garantire il corretto funzionamento del generatore ed evitare anomale sollecitazioni che possono danneggiare il generatore (come vibrazioni, disallineamenti, strane sollecitazioni etc.).

La macchina è stata progettata per garantire la potenza nominale in ambienti con temperatura massima di 40 °C e altitudine inferiore ai 1000 metri (EN60034-1), se non diversamente indicato. Per condizioni diverse vedere il catalogo commerciale (depliant).



## SAFETY REQUIREMENTS

Before installing the generator, arrangements must be made to earth the machine. This is the reason why you must make sure that the grounding system is in good conditions and in compliance with the regulations of the country where the generator will be installed.

### CAUTION

**THE FINAL INSTALLER IS RESPONSIBLE FOR THE INSTALLATION OF ALL THE PROTECTIONS (SECTIONING DEVICES, PROTECTIONS AGAINST DIRECT AND INDIRECT CONTACTS, OVERCURRENT AND OVERVOLTAGE PROTECTIONS, EMERGENCY STOP, ETC.) NECESSARY FOR THE MACHINE TO COMPLY WITH THE EXISTING INTERNATIONAL/EUROPEAN SAFETY REGULATIONS.**

For handling the unpacked generators, always use the special eyebolts only; use ropes having a suitable carrying capacity and do not lift the generator too much from the floor (max 30 cm.).

When the machine is worn out, contact the companies in charge of the disposal of ferrous material and do not throw away its parts into the environment.

The operators in charge of the installation, operation and maintenance of the generators must be skilled technicians who know the characteristics of the generators.

The people in charge of the handling must always wear work gloves and safety shoes. In case the generator or the whole plant must be lifted from the floor, the operators must wear a safety helmet.

The generator must be installed in an airy room. If there is not enough air, a malfunction or an overheating may occur (table 25 pag. 73). All entry doors into generator room should be clearly marked "Authorized persons only".

Make sure that gen-set foundations and baseframe are suitable to bear the combined weight of the alternators and prime mover.

The installer is responsible for the correct coupling of the generator to the engine and for the performance of all precautions necessary to guarantee the correct operation of the generator and avoid abnormal stress, which could damage the generator (such as vibrations, misalignment, strange noises or vibrations, etc.).

The machine was designed to guarantee the nominal power in environments with a maximum temperature of 40 °C, at altitudes lower than 1000 m asl (EN60034-1), unless otherwise specified; for different operating conditions, see the commercial catalogue (brochure).

## PRESCRIZIONI DI SICUREZZA

Nelle vicinanze della macchina non ci devono essere persone con indumenti svolazzanti tipo: sciarpe, fular, bracciali, etc e qualsiasi indumento deve essere chiuso con elastici alle estremità.

I generatori non devono mai e per nessuna ragione funzionare con le seguenti protezioni aperte:

- ) copertura morsetti.
- ) coperchi frontali.
- ) protezioni delle ventole.

Nelle fasi di montaggio e smontaggio della rete, assicurarsi di tenere in posizione con le mani la stessa per evitare che l'elasticità della rete possa colpire l'operatore o chi è nelle vicinanze.

In alcuni tipi di generatore i regolatori sono corredati di 3 led visibili dall'esterno (standard per macchine grandi e opzionale per macchine piccole):

- Verde** - funzionamento regolare
- Giallo** - intervento protezione sovraccarico
- Rosso** - intervento protezione bassa velocità.

I generatori sono rumorosi (tav. 25 pag. 73); anche se il livello acustico è sicuramente inferiore a quello del motore primario, devono essere installati in ambienti isolati (stanza, sala macchine, etc.) e chi vi accede deve munirsi di cuffie antirumore.

I generatori sviluppano calore anche elevato in funzione della potenza generata. Pertanto non toccare il generatore se non con guanti antiscottatura e attendere, una volta spento, che esso raggiunga la temperatura ambiente.

Anche se la macchina è protetta in tutte le sue parti evitare di sostare nelle sue vicinanze.

Per nessuna ragione appoggiarsi o sedersi sul generatore.

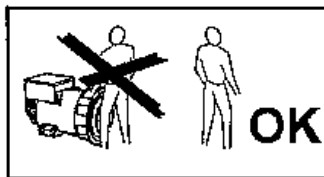
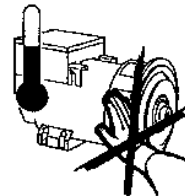
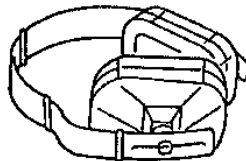
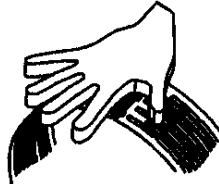
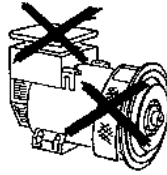
Non togliere per nessuna ragione le etichette, anzi richiedete la sostituzione in caso di necessità.

### PERICOLO DI CORTO CIRCUITO

Il generatore è costruito con grado di protezione IP21; pertanto è fatto divieto di utilizzare qualsiasi tipo di idropulitrice e di spruzzare liquidi sopra le parti elettriche.

In caso di sostituzione di pezzi di ricambio richiedere esclusivamente ricambi originali.

Per la sostituzione di parti usurate comportarsi rigorosamente come descritto al capitolo manutenzione; queste manutenzioni devono essere eseguite da tecnici adeguatamente qualificati.



## SAFETY REQUIREMENTS

No person must wear fluttering clothes (such as scarves, etc.) near the machine and any garment must be fastened with elastic bands at its ends.

The generators must never and for no reason run with following guards removed:

- ) terminals cover
- ) front covers
- ) fan guards.

During assembling and disassembling operations, hold carefully both ends of the protection grid as the related material elasticity can be harmful.

In some machines the regulators are equipped with 3 leds which can be seen from the outside (as standard equipment on large machines, as optional equipment on small machines):

- Green led** - correct operation
- Yellow led** - overload protection on
- Red led** - low speed protection on.

The generators are noisy (table 25 pag. 73); even if the sound level is certainly lower than that of the prime motor, they must be installed in soundproof rooms (room, engine room, etc.) where it is necessary to wear antinoise protectors.

The generators produce heat proportional to the output.

Therefore, do not touch the generator if you do not wear antiscorch gloves and, after switching it off, do not touch it until it has cooled down.

Even if all the machine components are protected, keep away from the machine.

Do not lean or sit on the generator for whatever reason.

Do not remove the labels for whatever reason; on the contrary, if necessary, replace them.

### DANGER OF SHORT CIRCUIT

the degree of protection of the generator is IP21; therefore it is made prohibition to use whichever type of hydrocleaner and to spray liquids over the parts containing electrical components.

In case of replacement of spare parts, use original spare parts only.

For the replacement of worn parts, carefully follow the maintenance instructions; these operations must be carried out by skilled technicians.

**PERICOLO  
DANGER**



**GEFAHR  
PELIGRO**

In funzione della destinazione, gli alternatori possono essere imballati per la spedizione in vari modi.

In ogni caso per movimentarli, osservare nella bolla di accompagnamento, il peso, e con mezzi adeguati, sollevarli da terra il meno possibile.

Nel caso che l'imballo debba essere movimentato con carrelli, occorre che le forche siano tenute piu' larghe possibile, in modo da evitare cadute o scivolamenti.

In caso di immagazzinamento, gli alternatori imballati e non, devono essere depositati in un locale fresco e asciutto e comunque mai esposto alle intemperie.

Una volta disimballato il generatore, (mono-supporto) non scollegare il sistema di fissaggio rotore, in quanto quest'ultimo potrebbe scivolare.

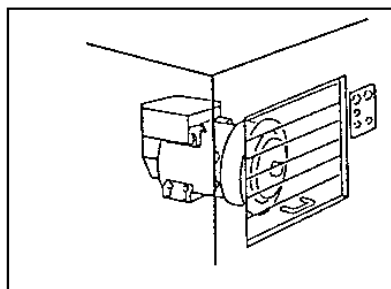
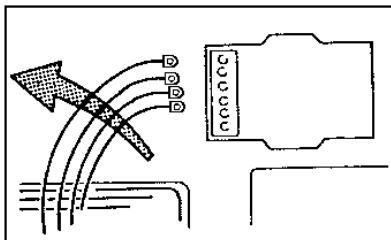
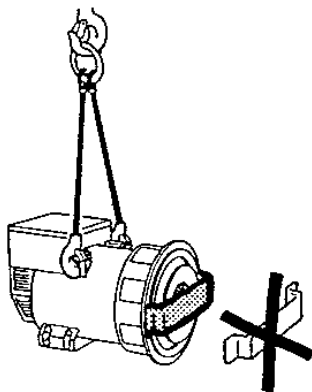
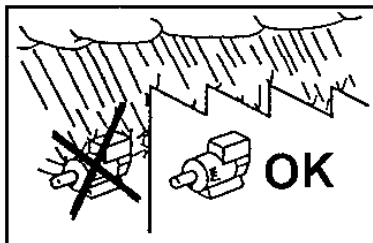
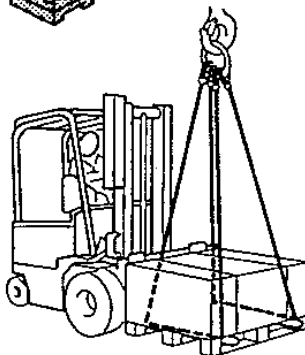
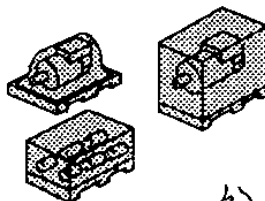
Per la movimentazione al fine dell'installazione, sollevare i generatori, sempre, attraverso i propri golfari (tav. 25 pag. 73).

**IMPORTANTE:**

**DOPO LUNGI PERIODI DI IMMAGAZZINAMENTO O IN PRESENZA DI SEGNI EVIDENTI DI UMIDITA' / CONDENZA, VERIFICARE LO STATO D'ISOLAMENTO.**

**LA PROVA DI ISOLAMENTO DEVE ESSERE ESEGUITA DA UN TECNICO ADEGUATAMENTE QUALIFICATO.**

**PRIMA DI ESEGUIRE TALE PROVA E' NECESSARIO SCONNETTERE IL REGOLATORE DI TENSIONE; SE LE PROVE DARANNO UN RISULTATO TROPPO BASSO (INFERIORE A 1 MΩ)(EN60204-1) SI DOVRA' ASCIUGARE L'ALTERNATORE IN UN FORNO A 50 - 60°C.**



Alternators will be packed for shipment in a manner suitable to their mode of transport and final destination.

Prior to handling goods, please ensure that lifting equipment is of sufficient capacity. Under lifting conditions machinery should be elevated to a minimal distance from the ground.

When lifting or moving goods by forklift apparatus, care should be taken to ensure that forks are correctly positioned to prevent slipping or falling of pallet or crate.

Both packed and unpacked alternators shall be stored in a cool and dry room, and shall never be exposed to the inclemency of the weather.

With regard to single bearing alternators (form MD35) please ensure that the rotor securing device is in place. Failure to do so may lead to slippage or assembly.

When installing the alternators, always lift them by using their eyebolts (table 25 pag 73).

**IMPORTANT :**

**AFTER PROLONGER STORAGE OR IF THE MACHINES SHOW SIGNS OF CONDENSATION, ALL WINDINGS SHOULD BE SUBJECTED TO INSULATION TESTS PRIOR TO OPERATING.**

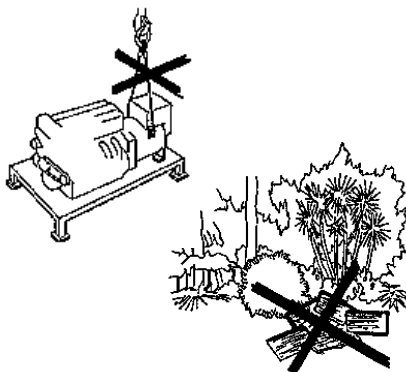
**THE INSULATION TEST SHALL BE MADE BY SKILLED PERSONNEL.**

**BEFORE CARRYING OUT THE TEST, THE VOLTAGE REGULATOR MUST BE DISCONNECTED; IF THE TEST RESULTS ARE TOO LOW (LOWER THAN 1 MΩ)(EN60204-1) THE ALTERNATOR MUST BE DRIED IN AN OVEN AT 50-60°C.**

## TRASPORTO E IMMAGAZZINAMENTO

Ricordarsi che, una volta che il generatore sarà accoppiato al motore primario, o montato su un basamento, o installato in un telaio in modo da formare un corpo unico, non dovrà più essere sollevato dai propri golfari ma si dovranno seguire le indicazioni dell'installatore.

Non disperdere l'imballo nell'ambiente, ma rivolgersi alle agenzie di smaltimento.



## TRANSPORT AND STORAGE

Once the generator is coupled with an engine, mounted on a baseframe, or installed on a complete generating set, it cannot be lifted by its lifting bolts. The relevant instructions for lifting complete generating set should be followed.

Any packing materials should be disposed of via correct waste disposal methods. Do not discard waste materials into the environment.

## ACCOPIAMENTO MECCANICO

Con il fine di proteggere, durante il trasporto e l'immagazzinamento, la flangia di accoppiamento o la estremità d'albero (a seconda della forma costruttiva del generatore) a tali parti meccaniche viene applicata una vernice antiruggine facilmente rimovibile. Tale sostanza DEVE ESSERE assolutamente RIMOSSA prima dell'assemblaggio finale.

L'accoppiamento del generatore al motore primo è a cura dell'utilizzatore finale ed è eseguito secondo la sua sola discrezione (per le coppie di serraggio vedere tabella 24 pag. 72).

Un allineamento impreciso può causare vibrazioni e danneggiamenti dei cuscinetti. È consigliabile inoltre verificare la compatibilità delle caratteristiche torsionali del motore / generatore (a cura del cliente).

I dati sul generatore necessari per tale verifica sono disponibili nella relativa documentazione tecnica.

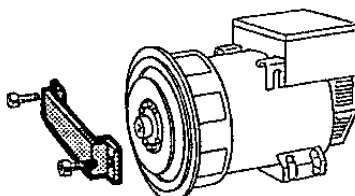
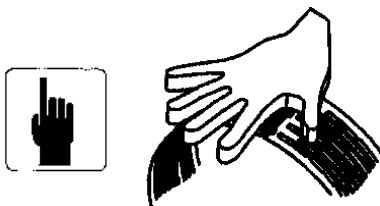
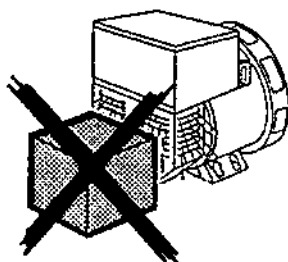
Le attenzioni richieste sono:

**NELLA MESSA IN SERVIZIO AVER CURA CHE LE APERTURE DI ASPIRAZIONE E SCARICO DELL'ARIA DI RAFFREDDAMENTO SIANO SEMPRE LIBERE.**

**IL LATO DI ASPIRAZIONE NON DEVE ESSERE VICINO A SORGENTI DI CALORE. IN OGNI CASO, SE NON SPECIFICAMENTE CONCORDATO, LA TEMPERATURA DELL'ARIA DI RAFFREDDAMENTO DEVE ESSERE QUELLA AMBIENTE E COMUNQUE NON SUPERIORE A 40°C.**

**NELLE FASI DI MONTAGGIO E SMONTAGGIO DELLA RETE, ASSICURARSI DI TENERE IN POSIZIONE CON LE MANI LA STESSA PER EVITARE CHE L'ELASTICITÀ DELLA RETE POSSA COLPIRE L'OPERATORE O CHI È NELLE VICINANZE.**

**IN CASO DI GENERATORI MONO-SUPPORTO IN FASE DI ACCOPIAMENTO CON IL MOTORE PRIMO, FARE ATTENZIONE CHE IL ROTORE NON SI SFILI; TOGLIERE IL SISTEMA DI FISSAGGIO ROTORE, SE PRESENTE.**



## MECHANICAL COUPLING

For transit and storage purposes the generator flange spigot and the generator end shaft (for the generators in B3-B14 construction form) have been coated with a rust preventer that can be removed easily.

This **MUST BE** removed before assembling to the engine.

The mechanical coupling is under the sole responsibility of the final user, and has to be done at his discretion (for tightening torque see tab. 24 pag. 72).

A bad alignment may cause vibrations and bearing damages. It is advisable to verify the compatibility of the engine / generator torsional characteristics (by the customer).

The necessary data for this verification are available on the concerning documentation.

Warnings:

**BEFORE STARTING THE ALTERNATOR, CHECK THAT THE AIR INLETS AND OUTLETS ARE FREE OF ANY OBSTRUCTIONS.**

**THE AIR INLETS SHOULD NOT BE NEAR ANY HEATING SOURCES.**

**IN ANY CASE, IF NOT SPECIFICALLY REQUESTED, THE COOLING AIR TEMPERATURE MUST BE EQUAL TO THE ENVIRONMENT TEMPERATURE AND NEVER HIGHER THAN 40°C.**

**DURING ASSEMBLING AND DISASSEMBLING OPERATIONS, HOLD CAREFULLY BOTH ENDS OF THE PROTECTION GRID AS THE RELATED MATERIAL ELASTICITY CAN BE HARMFUL.**

**BEFORE MECHANICAL COUPLING OF SINGLE BEARING ALTERNATORS REMOVE THE ROTOR SECURING DEVICE, IF FITTED, PLACED THERE TO PREVENT ROTOR FROM SLIPPING.**

## ACCOPPIAMENTO MECCANICO

### ISTRUZIONI PER MONTAGGIO IN FORMA COSTRUTTIVA MD35.

Un allineamento impreciso può causare vibrazioni e danneggiamenti dei cuscinetti. E' consigliabile inoltre verificare la compatibilità delle caratteristiche torsionali del motore / generatore (a cura del cliente).

I dati sul generatore necessari per tale verifica sono disponibili nella relativa documentazione tecnica.

Per l'accoppiamento del generatore con forma costruttiva MD35, procedere come segue:

a) verificare il corretto posizionamento dei dischi (quota "L") in funzione del tipo di accoppiamento considerato (tavola 24 pag. 72); se necessario ripristinare la quota "L" spostando leggermente e assialmente il rotore. In posizione corretta il cuscinetto posteriore deve avere un gioco assiale da 0,5 a 2 mm.

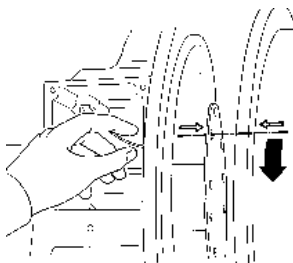
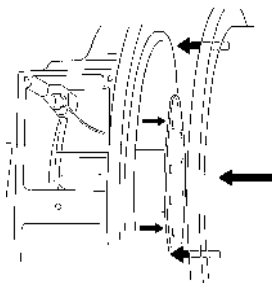
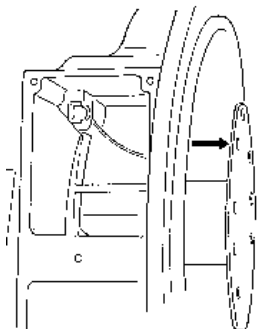
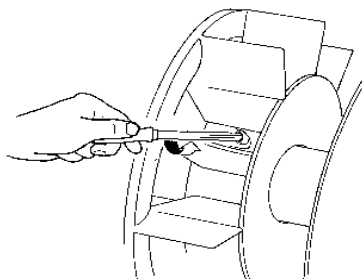
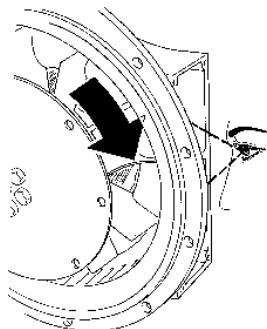
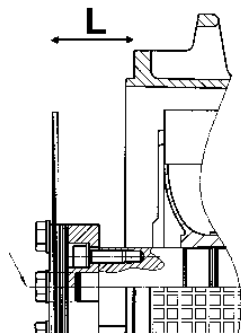
b) (Per serie 28) attraverso una delle due aperture laterali e ruotando manualmente il rotore, individuare sul mozzo della ventola, la relativa vite di bloccaggio

c) (Per serie 28) rendere la ventola libera di ruotare allentando la vite M8 di bloccaggio, utilizzando una chiave esagonale possibilmente con testa snodata

d) (Per serie 28) posizionare uno dei fori dei dischi in prossimità della parte alta di una delle aperture laterali e posizionare lo scarico realizzato su una delle pale della ventola, nella stessa posizione

e) avvicinare l'alternatore al motore di accoppiamento

f) allineare uno dei fori di fissaggio dei dischi del volano con il foro dei dischi precedentemente posizionato (punto "d")



## MECHANICAL COUPLING

### INSTRUCTIONS FOR THE ASSEMBLING OF GENERATORS WITH MD35 FORM.

A bad alignment may cause vibrations and bearing damages. It is advisable to verify the compatibility of the engine / generator torsional characteristics (by the customer).

The necessary data for this verification are available on the concerning documentation.

For the coupling of a generator with MD35 form, proceed as follows:

a) according to the type of the coupling, verify the correct placement of the discs (dimension "L") (table 24 pag. 72); if necessary restore the "L" dimension moving gently and axially the rotor. In the right position the clearance of rear bearing should be from 0.5 to 2 mm.

b) (For series 28) through one of the two lateral openings, and by manually rotating the rotor, detect the relevant clamp screw on the fan hub

c) (For series 28) let the fan be free to rotate by slackening the M8 screw by means of an hexagonal wrench, possibly having an articulated head

d) (For series 28) position one of the disk holes near the upper part of one of the side openings and place the slit that is on one of the fan blades, in the same position

e) move the generator close to the coupling engine

f) align one of the flywheel disk fastening holes with the holes of the previously positioned disks (point "d")

## ACCOPPIAMENTO MECCANICO

g) inserire ed avvitare parzialmente la relativa vite che blocca i dischi al volano. Tenendo ferma la ventola (ECP28), ruotare il volano affinché altri due fori si ripresentino nella stessa posizione ed avvitare parzialmente la relativa vite. Ripetere detta operazione per tutti gli altri fori

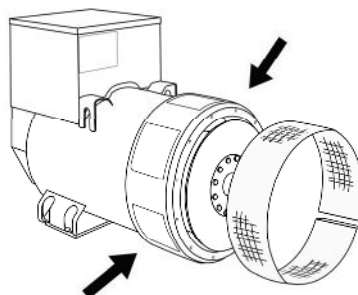
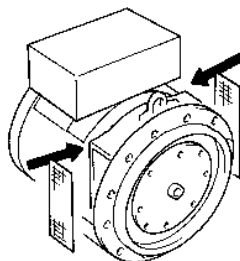
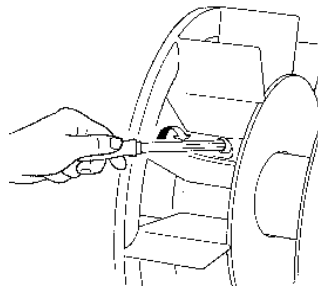
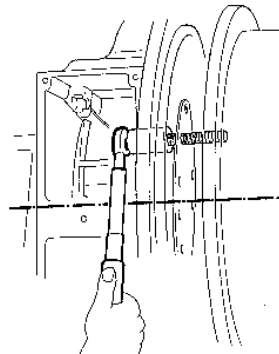
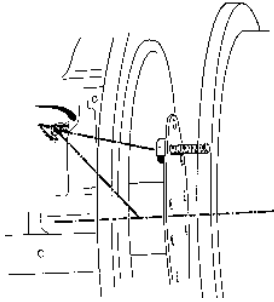
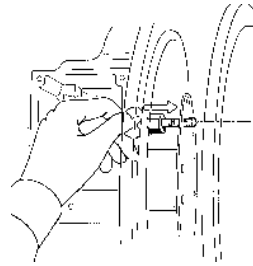
h) dopo aver verificato il corretto centraggio dei dischi nel volano motore, bloccare definitivamente dette viti

i) (Per serie 28) terminata l'operazione di bloccaggio dischi, ribloccare la ventola serrando la relativa vite con una coppia di serraggio pari a  $16 \text{ Nm} \pm 10\%$ ; la posizione radiale della ventola non è vincolante per il corretto funzionamento del sistema

l) montare le retine di protezione, fornite a corredo del generatore.

L'osservanza delle prescrizioni dei punti "i" ed "l" è di fondamentale importanza onde evitare seri danni del generatore e situazioni pericolose per cose e persone.

Solamente dopo che il generatore è stato ben fissato meccanicamente procedere all'accoppiamento elettrico.



## MECHANICAL COUPLING

g) Insert and partially tighten the screws that lock the disks to the flywheel. Keeping the fan still (ECP28), turn the flywheel until another two holes are in the same position and partially tighten the screw. Repeat this operation for all the other holes

h) after inspecting the correct centring of the disks on the engine flywheel, the screws must be completely tightened

i) (For series 28) once the clamping of the disks is over, stop the fan once again by tightening the screw with a torque wrench setting adjusted at  $16 \text{ Nm} \pm 10\%$ ; the radial position of the fan is not binding for the correct operation of the system

l) fix the protection grids supplied with the generator.

Compliance with items "i" and "l" is of the utmost consequence in order to avoid serious damages to the generator or hazardous situations for people or objects.

Only after a correct mechanical coupling, proceed with the electrical connections.

**PERICOLO  
DANGER**

**GEFAHR  
PELIGRO**

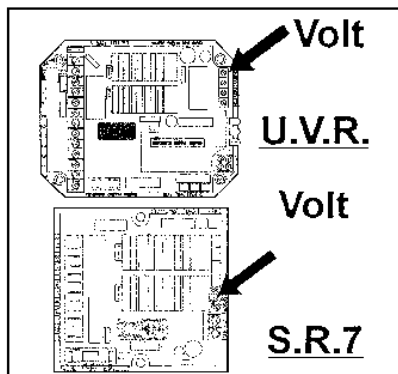
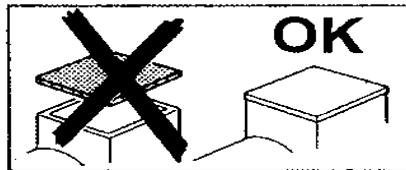
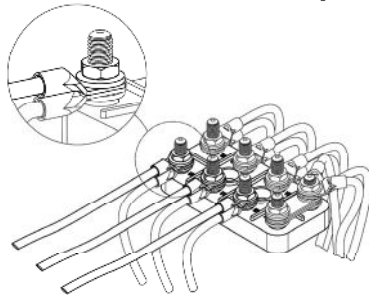
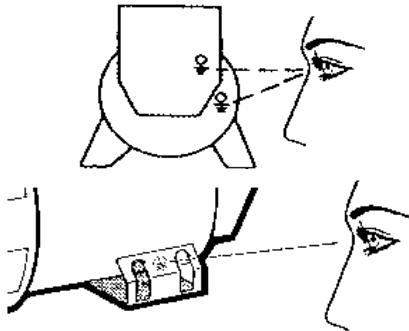
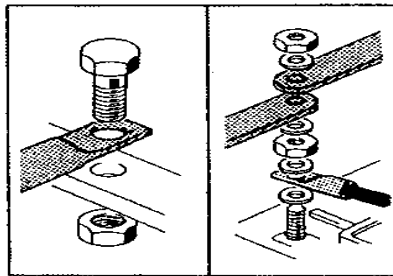
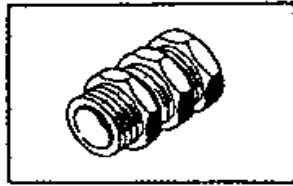


L'accoppiamento elettrico e' a cura dell'utilizzatore finale ed e' eseguito secondo la sua sola discrezione.  
Per l'ingresso nella scatola morsetti si raccomanda di utilizzare passacavi e serracavi in accordo con le specifiche del paese di esportazione.

**COLLEGAMENTO AVVOLGIMENTI**  
Sono previsti entrambi i collegamenti, stella con neutro (Y) e triangolo (Δ) in tutti gli alternatori (tav. 2 pag. 60).  
Per passare da un collegamento Y a Δ (es. da 400V a 230V) e' sufficiente spostare i ponti sulla morsettiera principale (vedere schema tav. 2 pag. 60).  
Nessun intervento e' richiesto sul regolatore di tensione.  
I generatori sono costruiti di serie con 12 cavi di uscita per consentire di ottenere tensioni diverse (es.230 / 400 / 460 / 800V).  
I generatori, vanno sempre collegati a terra con un conduttore di adeguata sezione utilizzando uno dei due (interno/esterno) appositi morsetti.  
Per il collegamento elettrico utilizzare cavi adeguati in funzione della potenza del generatore ed effettuare le connessioni ai morsetti come indicato nelle tavole 12 o 17.  
Dopo aver eseguito il collegamento (per le coppie di serraggio vedere tabella 24 pag.72) rimontare il coperchio scatola morsetti.

**IMPORTANTE:** variazioni di frequenza.  
La macchina fornita per funzionare a 50Hz puo' funzionare anche a 60Hz (o viceversa); e' sufficiente tarare il potenziometro al nuovo valore nominale di tensione.  
Passando da 50Hz a 60Hz, la potenza puo' aumentare del 20% (corrente invariata), se la tensione aumenta del 20%; se la tensione rimane invariata la potenza, puo' aumentare del 5% per effetto della migliore ventilazione.  
Per generatori costruiti appositamente per una frequenza di 60Hz nel passaggio a 50Hz, la tensione e la potenza devono necessariamente diminuire del 20% rispetto a quella riferita a 60Hz.

**REGOLATORI** (tav. 3 pag 60)  
I regolatori tipo U.V.R.6/1-F e S.R.7/2-G possono essere indifferentemente usati nella serie ECO-ECP senza modificare le prestazioni.  
L'U.V.R.6/1-F e' montato di serie nelle tipologie 38 - 40 - 43 - 46, mentre l'S.R.7/2-G nelle serie 28-31-32-34.  
I due regolatori sono perfettamente uguali nelle prestazioni, ma si differenziano nelle segnalazioni e nel riferimento.



All electrical output connections are the responsibility of, and are at the discretion of, the end user.  
When making terminal box connections, all cable and terminal lugs should meet the relevant standards of the country of final destination.

**WINDINGS CONNECTION**  
All alternators feature both star with neutral (Y) and delta (Δ) connections (table. 2 pag.60).  
To reconnect from a star to delta connection (for ex. from 400V to 230V), modify the linking arrangements on the output terminal board (see diagram on table 2 page 60).  
It is not necessary to adjust the voltage regulator.  
Standard alternators are equipped with 12 cables to offer different voltages (ex.230 / 400 / 460 / 800V).  
The alternator must always be earthed by sufficiently rated cable, using one of the inside or outside terminals. For the electrical connections use wires suitable for the power of the generator and connect them to the terminal board as indicated on table 12 or 17.  
After completing output connections (for tightening torque see tab. 24 pag. 72), ensure that the terminal box cover is securely in place.

**IMPORTANT:** frequency variations.  
A standard production machine wound for 50 Hz can also function at 60 Hz (and vice versa) by resetting the A.V.R. voltage potentiometer to the new nominal voltage value. When changing from 50 to 60 Hz the alternator power, and nominal voltage will increase by 20%, but the current does not change from 50 Hz value. Should voltage stay at 50 Hz nominal value, then the output power may be increased by 5% due to improved ventilation.  
For machines wound for 60 Hz, changing to 50 Hz, the voltage and power values have to decrease by 20% of 60 Hz value.

**REGULATORS** (table. 3 pag 60)  
Either U.V.R.6/1-F and S.R.7/2-G regulators can be used on the ECO-ECP series without affecting performances.  
The U.V.R.6/1-F is a standard feature on the 38-40-43-46 models whereas the S.R.7/2-G is standard on the 28-31-32-34 series.  
The two regulators ensure the same level of performance but have different signal systems and references.

## ACCOPIAMENTO ELETTRICO

### IMPORTANTE :

il controllo di tensione va eseguito a vuoto con l'alternatore funzionante a frequenza nominale.

Agendo sul potenziometro tensione dei regolatori elettronici si puo' ottenere la regolazione della tensione entro il  $\pm 5\%$  del valore nominale.

E' possibile ottenere la regolazione della tensione a distanza in un range di  $\pm 5\%$  inserendo negli appositi morsetti un potenziometro da 100K (per le macchine a 6 morsetti) o un potenziometro da 100K con in serie una resistenza da 100K (per le macchine a 12 morsetti).

Istruzioni per il collegamento del potenziometro esterno :

**ATTENZIONE:** quando si collega il potenziometro esterno è necessario seguire la procedura sottoriportata per ottenere un corretto funzionamento dell'alternatore.

- 1) Ruotare il trimmer VOLT nel regolatore elettronico completamente in senso antiorario
- 2) Posizionare il potenziometro esterno a meta' corsa e connetterlo agli appositi morsetti del regolatore elettronico
- 3) Tramite il trimmer VOLT del regolatore elettronico tarare la tensione al valore nominale.

### PROTEZIONI

#### U.V.R.6/1-F - S.R.7/2-G

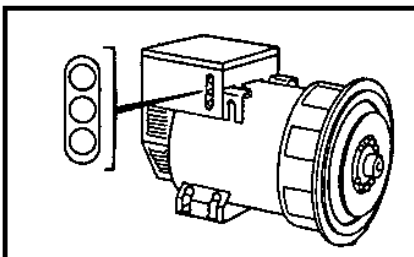
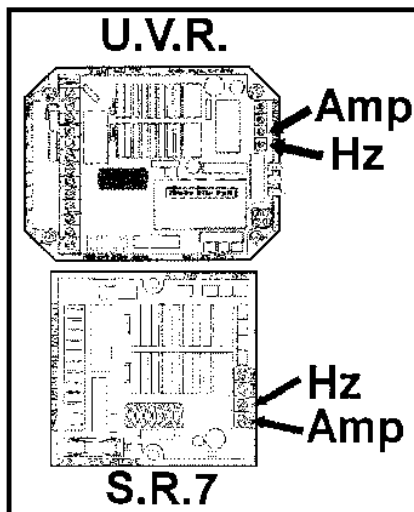
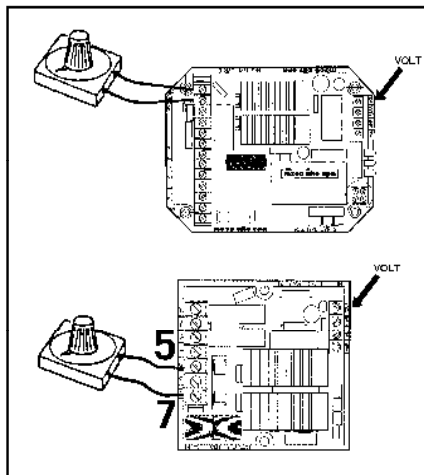
Entrambi i regolatori sono provvisti di una protezione di bassa velocita' la cui soglia di intervento e' regolabile tramite il potenziometro "Hz". L'intervento di tale protezione e' istantaneo riducendo la tensione di macchina quando la frequenza scende sotto il 10% di quella nominale. I regolatori prevedono anche una seconda protezione (protezione di sovraccarico), che sente la tensione parzializzata che va al campo di statore dell'eccitatrice e se essa supera per piu' di 20 sec il valore stabilito, abbassa la tensione di macchina limitando la corrente di eccitazione entro valori di sicurezza.

Il ritardo appositamente inserito consente lo spunto del motore che normalmente si avvia in 5 - 10 sec. Anche la soglia di intervento di questa protezione e' regolabile tramite il potenziometro "AMP".

#### U.V.R.6/1-F

Il regolatore U.V.R.6/1-F aggiunge alle prestazioni prima descritte, le seguenti caratteristiche:

- 1 - possibilita' di avere il riferimento trifase oltre che monofase.
- 2 - segnalazioni a led di autodiagnostica che indicano le condizioni di funzionamento della macchina: un led verde, che normalmente acceso indica il funzionamento normale del generatore; un led rosso che indica l'intervento della protezione di bassa velocita', un led giallo che indica l'intervento della protezione di sovraccarico.



## ELECTRICAL CONNECTIONS

### IMPORTANT :

the generator output voltage must be checked under no-load conditions, with the correct setting of frequency.

The voltage may be adjusted by  $\pm 5\%$  of the nominal, by acting upon the voltage potentiometer on the electronic regulators.

It is possible to get a remote voltage regulation of  $\pm 5\%$  inserting in the proper terminals a 100K potentiometer (for the 6 lead units) or a 100K potentiometer with a 100K resistance in series (for the 12 lead units).

Instructions to follow for the external potentiometer connection:

**CAUTION:** in order to get a correct working of the alternator, it is necessary to follow the following procedure, connecting the external potentiometer.

- 1) Turn the VOLT trimmer of the electronic regulator completely anticlockwise.
- 2) Set the external potentiometer at half turn and connect it to the proper terminals of the electronic regulator.
- 3) Adjust the voltage at the nominal value by the VOLT trimmer of the electronic regulator.

### PROTECTIONS

#### U.V.R.6/1-F - S.R.7/2-G

Both regulators are provided with an underspeed protection with an intervention threshold which can be adjusted by the potentiometer marked "Hz". This protection intervenes instantaneously by reducing the alternator voltage to a safe value when frequency falls below 10% of the nominal value. These regulators also have inherent overload protection which senses the exciter field voltage value. Should this field voltage value exceed the nominal value for a period of more than 20 seconds, then again the alternator voltage is automatically reduced to a safe operating level. This overload function has a built-in delay to allow for the overload when starting motors (normally 5-10 seconds). The operating threshold of this protection device is adjustable by the potentiometer marked "AMP".

#### U.V.R.6/1-F

Aside from the above mentioned characteristics, the U.V.R.6/1-F regulator also offers the following:

- 1 - possibility to have single-phase as well as three-phase sensing
- 2 - led indicators for self-diagnosis which indicate the unit's operational conditions: a green led which when lit confirms the alternator's normal functioning; a red led indicates the underspeed protection is on; a yellow led indicates the overload protection is on.



## ACCOPPIAMENTO ELETTRICO

### IMPORTANTE

Nel funzionamento normale del generatore deve essere acceso solamente il led verde. Tutte queste segnalazioni possono essere remote a distanza e manipolate per usi diversi tramite l'utilizzo del dispositivo chiamato SPD96/A, disponibile a richiesta.

### CAUSE CHE PROVOCANO L'INTERVENTO DELLE PROTEZIONI.

#### Intervento istantaneo protezione bassa velocità:

1 - velocità ridotta del 10% rispetto ai dati di targa.

#### Intervento ritardato protezione sovraccarico :

2 - sovraccarico del 20% rispetto ai dati di targa.

3 - fattore di potenza ( $\cos \varphi$ ) inferiore ai dati di targa.

4 - temperatura ambiente oltre i 50°C.

#### Intervento di entrambe le protezioni:

5 - combinazione del fattore 1 con i fattori 2, 3, 4.

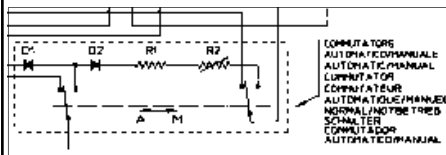
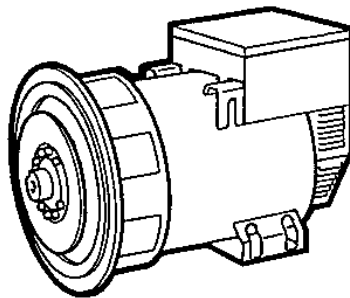
Nel caso di intervento delle protezioni, la tensione erogata dall'alternatore scenderà fino ad un valore che dipenderà dall'entità dell'anomalia.

La tensione tornerà automaticamente al suo valore nominale qualora venga a cessare l'inconveniente.

Per maggiori dettagli sui regolatori consultare il manuale specifico.

### OPTIONALS :

Tutti gli alternatori della serie ECO-ECP possono anche funzionare con regolazione manuale, senza l'ausilio di sorgenti esterne ma con il solo utilizzo di un reostato (tav. 10-11 pag. 65).



## ELECTRICAL CONNECTIONS

### IMPORTANT

In normal functioning, only the green led has to be lit.

All these indicators can be remotely controlled and adjusted, for any type of use, by utilizing the SPD96/A accessory which is available on request.

### INTERVENTION OF PROTECTION DEVICES CAUSES.

#### Underspeed protection instantaneous intervention :

1 - speed reduced by 10% of nominal RPM

#### Delayed intervention of overload protection :

2 - overload by 20% of nominal rating.

3 - power factor ( $\cos \varphi$ ) lower than the nominal one.

4 - ambient temperature above 50°C.

#### Intervention of both protections :

5 - combination of factor 1 with factors 2, 3, 4.

In case of intervention the output voltage will drop down to a value which will depend on the fault.

The voltage will return automatically to its nominal value as soon as the fault is removed.

For further details on regulators, please see the specific manual.

### OPTIONALS :

All ECO-ECP series alternators can function with manual regulation, without assistance from any external source, by using a rheostat (tab. 10-11 pag. 65).

## ACCOPIAMENTO ELETTRICO

### FUNZIONAMENTO IN PARALLELO

Nel caso si voglia far funzionare dei generatori in parallelo e' necessario montare un dispositivo che assicura un identico statismo sulla caratteristica esterna.

Questo significa che se le macchine lavorassero separatamente si avrebbe una uguale caduta di tensione (circa 4%) passando da vuoto a pieno carico.

Questo dispositivo e' montato di serie sulle grandezze 40 - 43 - 46, per cui, quando due o piu' di queste macchine devono lavorare in parallelo e' sufficiente togliere il ponticello che cortocircuita il secondario del dispositivo di parallelo.

Per le grandezze inferiori il dispositivo viene montato a richiesta o puo' essere montato (ad eccezione del tipo ECP28/4) dal cliente stesso secondo le tav.14-16-18-20. Dopo aver montato il dispositivo e' necessario verificare l'esatto collegamento; si dovra' controllare cioe' che le macchine lavorando singolarmente presentino una caduta di tensione di circa il 4% passando, a velocita' nominale e  $\cos \varphi$  0.8, da vuoto a pieno carico.

### MONTAGGIO DI UN DISPOSITIVO DI PARALLELO

Riferendosi alle tavole 14-16-19 montare il trasformatore di parallelo come illustrato.

Collegare le spire di potenza in serie alla fase.

Il numero delle spire da eseguire sul trasformatore saranno indicate sulle istruzioni allegate al trasformatore stesso.

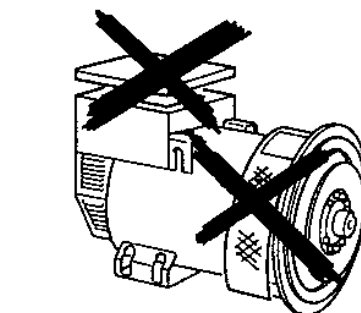
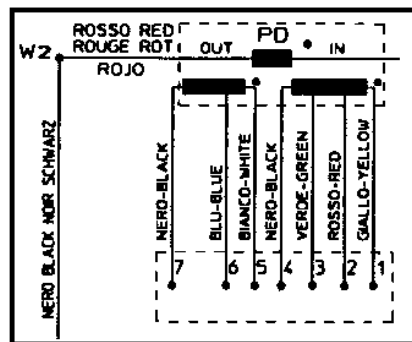
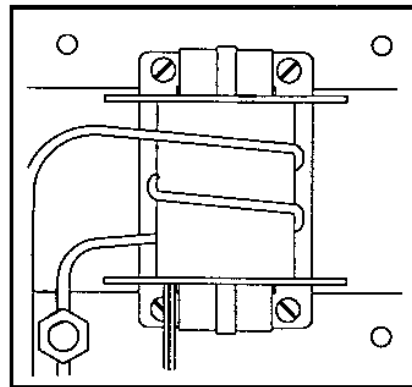
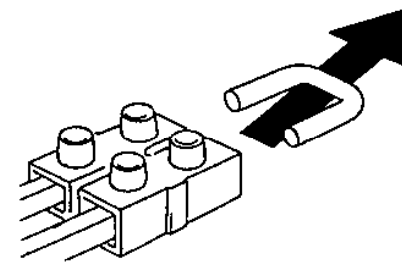
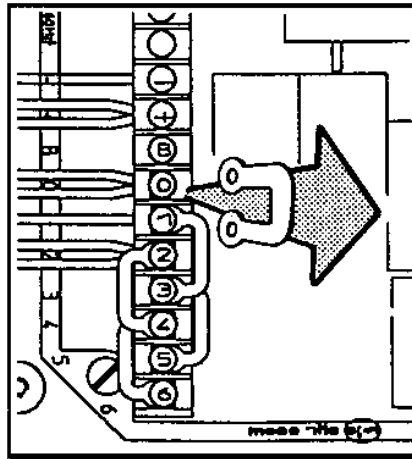
Il secondario del trasformatore di parallelo va connesso in serie al riferimento del regolatore elettronico come mostrato nelle tavole 4 e 5 pag. 61.

Per abilitare il dispositivo di parallelo rimuovere il ponticello che cortocircuita il secondario del dispositivo stesso come mostrano gli schemi sopra indicati.

### NOTA

Alla richiesta del dispositivo di parallelo e' indispensabile conoscere i dati nominali dell'alternatore su cui andra' applicato.

Dopo aver eseguito tutti i collegamenti elettrici e **solo dopo aver chiuso tutte le protezioni** e' possibile effettuare la prova di primo avviamento del sistema.



## ELECTRICAL CONNECTIONS

### PARALLEL OPERATION

Should the alternators be required to operate in parallel, it is necessary to add a paralleling device to ensure equal droop of generator output voltages.

This ensures that if the machines are operated separately, the voltage droop (4% approx.) is equal when switching from no-load to full load.

The parallel device is fitted as standard on 40-43-46 models, therefore when two or more of these units must function in parallel, it is sufficient to remove the bridge which shortcircuits the secondary winding of the parallel device.

On smaller models this device is mounted on request or it can be added (except for ECP28/4) by the client himself following the instructions of tables 14-16-18-20.

After the device has been mounted, check whether the connection has been properly made; make sure that there is a voltage drop of approximately 4% in the machines when they function individually switching at rated speed and  $\cos \varphi$  0.8 from no-load to full load operation.

### HOW TO MOUNT THE PARALLEL DEVICE

Referring to tables 14-16-19 mount parallel device as indicated.

Connect the power turns in series with phase. The numbers of turns to be wound on the transformer will be indicated in the instruction accompanying the transformer itself. The secondary winding of the parallel transformer must be connected in series to the sensing of the electronic regulator as shown on tables 4 - 5 page 61.

In order to activate the parallel device remove the bridge which shortcircuits the secondary winding of the device itself as shown in the above mentioned tables.

### NOTE

When requesting a parallel device, it is necessary to indicate the nominal data of the alternator on which the device will be applied.

After all the electric connections have been made and **only after all the protections have been put in place**, can the system be started.

## AVVIAMENTO E ARRESTO

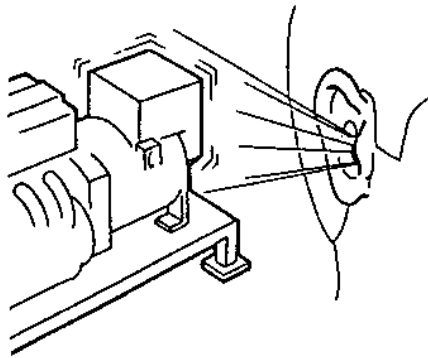
La strumentazione per l'avviamento, la conduzione e l'arresto del sistema e' a carico dell'installatore.

**LE OPERAZIONI DI AVVIAMENTO, CONDUZIONE E ARRESTO DEVONO ESSERE ESEGUITE DA PERSONALE ADEGUATAMENTE QUALIFICATO E CHE ABBA LETTO E COMPRESO LE PRESCRIZIONI DI SICUREZZA ALL'INIZIO DEL MANUALE.**

### IMPORTANTE :

Durante il primo avviamento, che deve essere eseguito a velocita' ridotta, l'installatore dovra' verificare che non si presentino rumori anomali.

In caso di rumori anomali provvedere a fermare immediatamente il sistema e intervenire per migliorare l'accoppiamento meccanico.



## STARTING AND STOPPING OPERATIONS

All the instrumentation for starting, running and stopping the system shall be provided by the installer.

**THE STARTING, RUNNING AND STOPPING OPERATIONS MUST BE CARRIED OUT BY SKILLED PERSONNEL WHO HAVE READ AND UNDERSTOOD THE SAFETY INSTRUCTIONS AT THE BEGINNING OF THIS MANUAL.**

### IMPORTANT :

When the system is set to work for the first time, which has to be done at a reduced speed, the operator shall check that no anomalous noises can be detected.

If an anomalous noise is detected, stop the system immediately and improve the mechanical coupling.

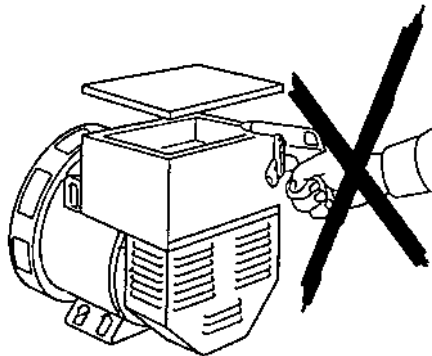
## PULIZIA E LUBRIFICAZIONE

Prima di avvicinarsi al generatore assicurarsi che sia a stato energetico zero e a temperatura ambiente; a questo punto e' possibile pulirlo esternamente con aria compressa.

**NON UTILIZZARE MAI LIQUIDI O ACQUA.**

**NON PULIRE CON ARIA COMPRESSA LE PARTI ELETTRICHE INTERNE, POICHE' POSSONO VERIFICARSI CORTOCIRCUITI O ALTRE ANOMALIE.**

Per la lubrificazione dei cuscinetti consultare la tabella 23 pag. 71.



## CLEANING AND LUBRICATION

Prior to approaching or touching the alternator, ensure that it is not live and it is at room temperature; at this stage it is possible to clean it on the outside using compressed air.

**NEVER USE LIQUIDS OR WATER.**

**DO NOT CLEAN THE INSIDE ELECTRIC COMPONENTS WITH COMPRESSED AIR, BECAUSE THIS MAY CAUSE SHORT-CIRCUITS OR OTHER ANOMALIES.**

For the lubrication of bearings, see table 23 on page 71.

## MANUTENZIONE

## MAINTENANCE

**PERICOLO  
DANGER**



**GEFAHR  
PELIGRO**

I generatori della serie ECO-ECP sono costruiti per lavorare a lungo senza manutenzione.

**PRIMA DI ESEGUIRE QUESTA OPERAZIONE LEGGERE MOLTO ATTENTAMENTE LE PRESCRIZIONI DI SICUREZZA ALL'INIZIO DI QUESTO MANUALE.**

The alternators series ECO-ECP are designed to give a long maintenance free working life.

**BEFORE PERFORMING THIS OPERATION, READ THE SAFETY REQUIREMENTS AT THE BEGINNING OF THIS MANUAL CAREFULLY.**

## MANUTENZIONE

Gli interventi di manutenzione sul generatore Mecc Alte si possono dividere in ordinari e straordinari; in ogni caso qualsiasi intervento deve essere autorizzato dal responsabile della sicurezza, a macchina ferma e isolata elettricamente dall'impianto o dalla rete. La manutenzione e la ricerca guasti deve essere eseguita da personale elettricamente/meccanicamente qualificato in quanto ogni operazione a seguito descritta presenta pericoli per il personale.

Si raccomanda inoltre che siano prese tutte le precauzioni per impedire che la macchina venga riavviata inavvertitamente durante le fasi di manutenzione e ricerca guasti.

Gli interventi di manutenzione ordinaria possono essere riassunti in :

- verifiche condizioni avvolgimenti dopo lunghi periodi di immagazzinamento o di sosta
- verifiche, ad intervalli regolari, del corretto funzionamento (assenza di rumori o vibrazioni anomale)
- verifiche meccaniche su tutti i bulloni di fissaggio ed in particolare delle connessioni elettriche
- pulizia esterna del generatore

### a) Verifiche condizioni avvolgimenti dopo lunghi periodi di immagazzinamento o di sosta.

La condizione degli avvolgimenti può essere verificata mediante la misura della resistenza di isolamento verso terra. Tale misura si esegue con uno strumento "Megger" o similari a 500V di tensione continua; è importante che prima di eseguire la prova, il regolatore di tensione (fig. a), il ponte diodi rotante (fig. b), i filtri anti disturbi radio (fig. c) e tutti gli eventuali dispositivi connessi elettricamente agli avvolgimenti da verificare, vengano scollegati.

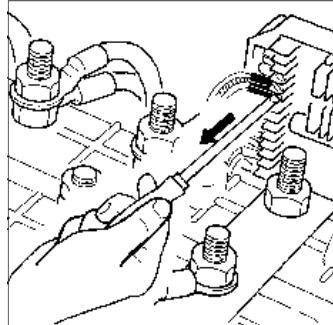
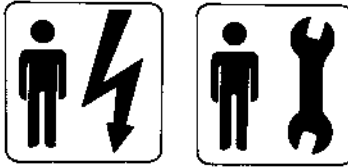


fig. a

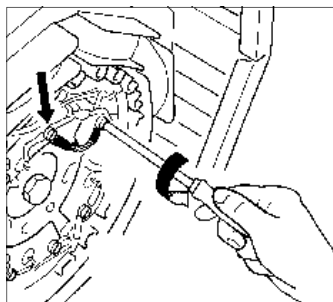


fig. b

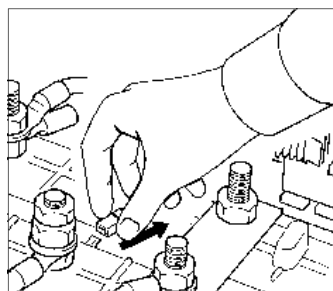


fig. c

## MAINTENANCE

Maintenance operations on Mecc Alte generators can be divided into routine and extraordinary maintenance operations; in both cases, all operations must be authorised by the safety representative and they must be carried out when the machine is turned off and insulated from the electric installation or from the power mains.

High-qualified mechanical or electrical technicians must carry out maintenance operations and any fault search since all operations described hereunder could put personnel in serious danger.

It is also highly recommended to take all the necessary precautions so as to prevent an inadvertent starting of the machine during maintenance and fault search operations.

Routine maintenance operations can be summed up as follows:

- Assessment of windings conditions after long periods of storage or inactivity
- Assessment, on a regular basis, of correct functioning (absence of anomalous noises or vibrations)
- Mechanical inspections on all fastening bolts and, in particular, on electric connections
- external cleaning of generator

### a) Assessment of windings conditions after long periods of storage or inactivity.

Measuring the insulating earth resistance can assess the condition of the windings. This measurement can be carried out with a "Megger" device, or similar, with a 500V direct-current voltage. It is very important to disconnect the voltage regulator (fig. a), the rotating diode bridge (fig. b) and the radio-interference filter (fig. c), as well as any other device connected to the windings to be checked, before carrying out the measurement.

## MANUTENZIONE

Il valore misurato di resistenza verso terra di tutti gli avvolgimenti deve essere superiore a  $1M\Omega$ .

Nell'ipotesi in cui il valore misurato sia inferiore a quanto sopra riportato, gli avvolgimenti devono essere opportunamente asciugati. Tale operazione può essere eseguita indirizzando un getto di aria calda a circa  $50-60^{\circ}\text{C}$ , negli ingressi o nelle uscite dell'aria del generatore.

In alternativa a quanto sopra, gli avvolgimenti di statore possono essere collegati elettricamente e fatti attraversare da una corrente mediante un alimentatore in continua; il valore di corrente da fare circolare negli avvolgimenti dipenderà dalle dimensioni dell'alternatore e comunque dovrà essere stabilito in accordo ai valori nominali riportati nella targhetta.

### b) Verifiche del corretto funzionamento (assenza di rumori o vibrazioni anomale).

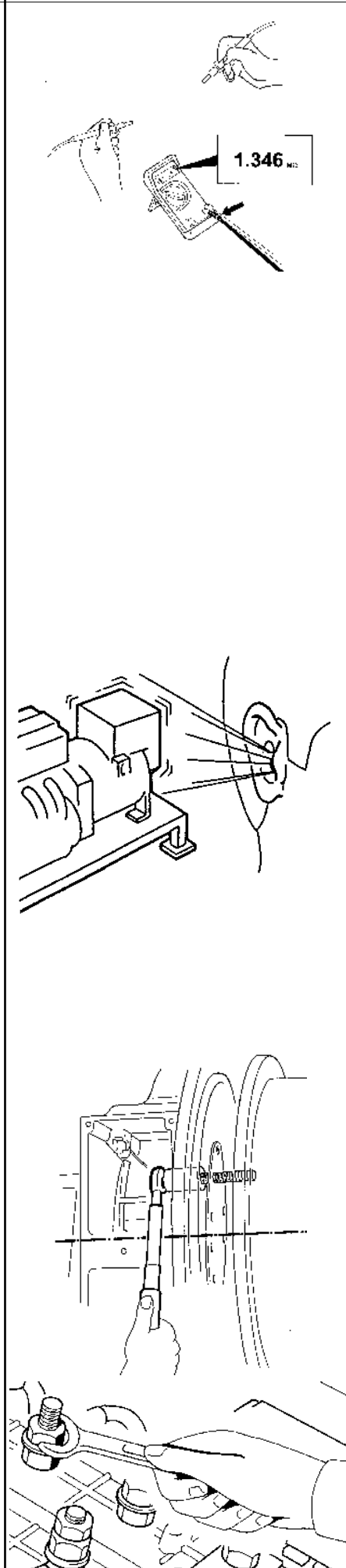
Ad intervalli regolari raccomandiamo di verificare che il generatore funzioni regolarmente senza rumori o vibrazioni anomale; tali presenze potrebbero denotare il danneggiamento dei cuscinetti.

Ricordiamo che l'alternatore a sé stante non presenta vibrazioni particolari in quanto le parti rotanti sono perfettamente bilanciate. Premesso che la bilanciatura del rotore non sia stata alterata e che i cuscinetti dell'alternatore non siano danneggiati, le cause delle vibrazioni presenti sul gruppo elettrogeno saranno da ricercare negli allineamenti degli accoppiamenti, nelle sollecitazioni del motore termico o nei supporti antivibranti.

Si raccomanda inoltre di verificare i dati funzionali che devono risultare in linea con quanto riportato nella targhetta del generatore.

### c) Verifiche meccaniche su tutti i bulloni di fissaggio ed in particolare delle connessioni elettriche.

Ad intervalli regolari raccomandiamo di verificare che tutti i bulloni di fissaggio siano adeguatamente stretti; una particolare attenzione deve essere rivolta alle connessioni elettriche, operazione che deve essere eseguita con la assoluta certezza di assenza di tensione. Nel manuale del generatore sono indicate le corrette coppie di serraggio delle varie dimensioni di bullone.



## MAINTENANCE

The figure resulting from the measurement of the windings' earth resistance must be over  $1M\Omega$ .

Should the figure be smaller than the above-mentioned one, the windings must be adequately dried up. This can be done by directing a jet of hot air of about  $50-60^{\circ}\text{C}$  into the generator's air inlets or outlets; alternatively, the stator's windings can be electrically connected and a voltage can be passed through them by means of a direct-current power supply. The amount of current in the windings depends on the generator size, even though it must be fixed according to the nominal values stated on the plate.

### b) Assessment of current functioning (absence of anomalous noises or vibrations).

We recommend users to check regularly the correct functioning of the generator, and to verify that there are no anomalous noises or vibrations; their presence might indicate damage of bearings.

May we remind you that the alternator itself has no particular vibration since the rotating parts are perfectly balanced. Provided that the rotor balancing has not been altered and that the rotor's bearings have not been damaged, vibrations in the generator set may occur due to alignments of couplings, due to stress upon the combustion engine, or to vibration mounts.

We also recommend checking of performance data which must comply with the data on the generator's plate.

### c) Mechanical checks of fastening bolts and, in particular, of electric connections.

We recommend a regular check of all fastening bolts, which must be perfectly tightened up. Special attention should be paid to all electric connections; this inspection must be carried out in the complete absence of voltage. To choose the correct tightening wrenches suitable for the different sizes of the bolts, see generator manual.

## MANUTENZIONE

### d) Pulizia esterna ed interna del generatore.

Per la pulizia esterna del generatore è possibile utilizzare dell'aria compressa; vietiamo assolutamente l'uso di qualsiasi tipo di idropulitrice e di liquidi detergenti; il grado di protezione standard del generatore è IP21 e pertanto utilizzando liquidi potrebbero verificarsi delle anomalie o anche cortocircuiti.

Gli interventi di manutenzione straordinaria possono essere riassunti in:

- manutenzione dei cuscinetti ed eventuale sostituzione
- pulizia dei filtri aria (se presenti)
- pulizia degli avvolgimenti
- sostituzione del ponte a diodi
- sostituzione dell'eccitatrice
- sostituzione del regolatore di tensione
- controllo della tensione residua

### a) Manutenzione dei cuscinetti ed eventuale sostituzione.

Tutti i cuscinetti sono ingrassati in fase di montaggio; il grasso impiegato normalmente è del tipo SKF28 o equivalenti.

Tutti i generatori ad eccezione dei tipi ECO40, ECO43N ed ECO46, montano cuscinetti di tipo stagno; per tali tipi di cuscinetti non sono necessarie manutenzioni per tutto il periodo di funzionamento (stimabile in circa 30.000 ore).

Per i generatori tipo 40, 43 e 46, ad intervalli regolari (vedere tabella cuscinetti) occorre procedere all'ingrassaggio dei cuscinetti mediante un apposito ingrassatore a pressione.

Controlli periodici durante il periodo di funzionamento, devono essere eseguiti per verificare eventuali surriscaldamenti o rumori; eccessive vibrazioni possono essere causate da una usura anomala del cuscinetto.

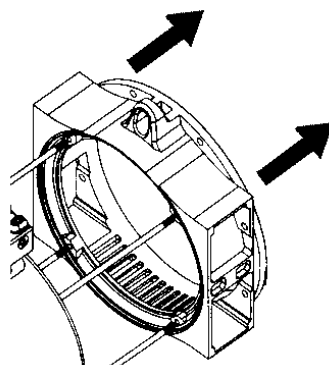
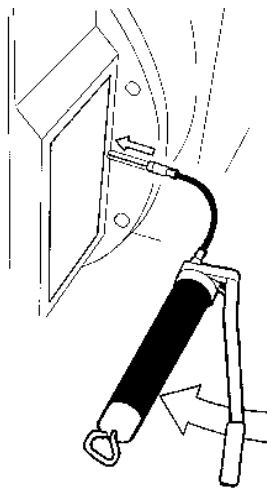
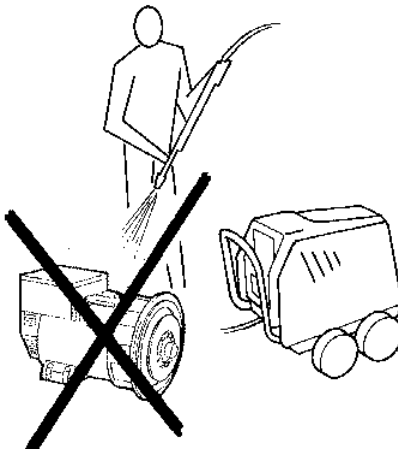
In tal caso, il cuscinetto deve essere smontato per essere esaminato ed eventualmente sostituito.

Qui di seguito viene descritta la procedura per sostituire il cuscinetto.

### Generatore tipo 28-31-32-34.

Per smontare l'alternatore della serie 28-31-32-34, attenersi alle seguenti istruzioni:

-) togliere il coperchio anteriore



## MAINTENANCE

### d) Internal and external cleaning of the generator.

For the external cleaning of the generator, you can use compressed air. The use of hydro-cleaners and detergent fluids is strictly forbidden. The standard protection degree of the generator is IP21; therefore, use of fluids could cause anomalies or even short-circuits.

Extraordinary maintenance operations can be summed up as follows:

- Maintenance and replacement (if necessary) of bearings
- Cleaning of air filters (if available)
- Cleaning of windings
- Replacement of diode bridge
- Replacement of exciter
- Replacement of voltage regulator
- Check of residual voltage

### a) Maintenance and replacement (if necessary) of bearings.

During the assembling phase, all bearings are greased with SKF28 grease, or similar.

All generators, except the ECO40, the ECO43N and ECO46 versions, are equipped with sealed bearings; for this kind of bearing, no maintenance is required for the total operating time (estimated: 30.000 hours).

Bearings of alternator versions 40, 43 and 46 must be greased on a regular basis by means of a pressure grease cup (see bearings chart).

During the operating time, checks to detect presence of either overheating, or noises, must be carried out on a regular basis. If the bearing is worn off, it can cause excessive vibrations. In such a case, the bearing must be removed, examined, and if necessary, replaced.

A description of the procedure for a bearing replacement.

### Generator versions: 28-31-32-34.

To disassemble alternator versions 28-31-32-34, follow these instructions:

-) Remove front cover

## MANUTENZIONE

-) sfilare il rotore utilizzando un mezzo di sollevamento con funi morbide ma di portata adeguata; verificare che i mezzi di sollevamento predisposti siano comunque adeguati per i pesi dei componenti da movimentare

-) per estrarre il cuscinetto deve essere utilizzato un apposito estrattore

-) per il montaggio del nuovo cuscinetto, riscaldare lo stesso con un apposito dispositivo magnetico

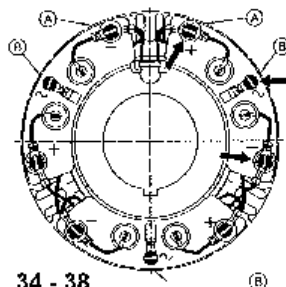
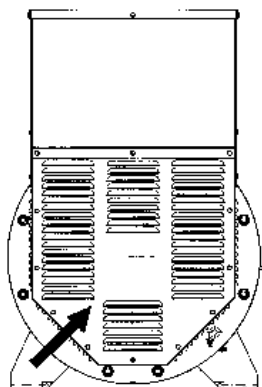
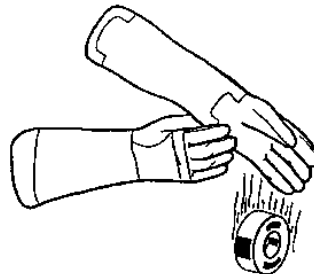
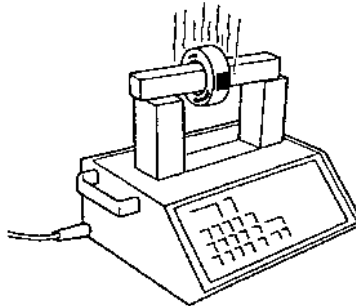
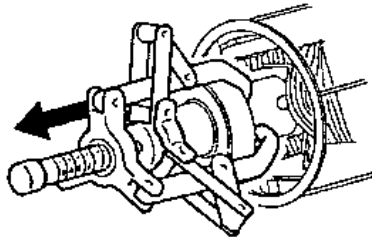
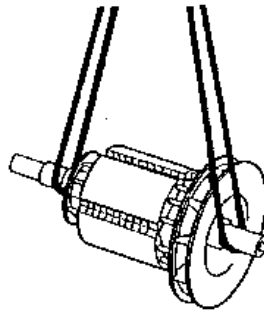
-) indossando gli appositi guanti anti-scottatura, montare il cuscinetto nella sua sede

### Generatore tipo 38-40-43-46.

Per smontare l'alternatore della serie 38-40-43-46, è necessario rimuovere l'eccitatrice, pertanto attenersi alle seguenti istruzioni :

-) togliere la chiusura posteriore

-) sconnettere i cinque fili del ponte diodi rotante "A" e "B".



34 - 38

ⓑ

## MAINTENANCE

-) Use a lifting device equipped with soft ropes of an adequate lifting capacity to extract rotor. Make sure that the lifting devices are suitable for the weight of the parts to be shifted;

-) To pull the bearing out, use a puller

-) To insert new bearing, heat it with a suitable magnetic device

-) Put on safety gloves and insert bearing into its place

### Generator versions: 38-40-43-46.

To disassemble alternator versions 38-40-43-46, remove exciter as follows:

-) Remove rear seal

-) Disconnect the five wires of the rotating diode bridge "A" and "B".

## MANUTENZIONE

-) nel caso di alternatori della serie 38, togliere le viti di bloccaggio dei settori porta diodi del ponte rotante, mentre nel caso di alternatori della serie 40-43-46 togliere il bullone di bloccaggio e tirando leggermente togliere il ponte diodi

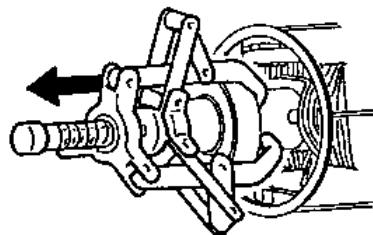
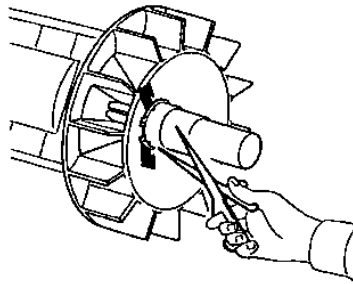
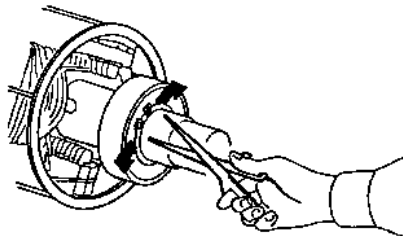
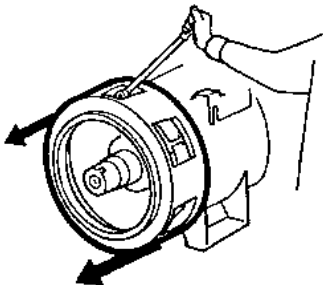
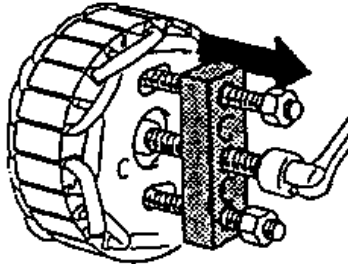
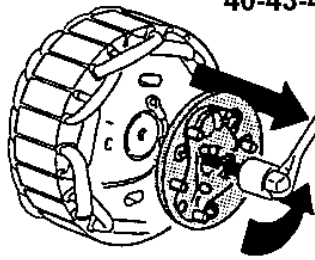
-) inserire un adeguato estrattore per sfilare il rotore eccitatrice

-) dal lato accoppiamento sfilare il rotore principale; nel caso in cui il diametro del coperchio anteriore fosse minore del diametro esterno della ventola, togliere il coperchio stesso per sfilare il rotore

-) togliere gli anelli seeger servendosi di una pinza adeguata

-) per estrarre il cuscinetto deve essere utilizzato un apposito estrattore

40-43-46



## MAINTENANCE

-) When dealing with versions 38, remove clamp screws from the diodes area of the rotating bridge, whilst when dealing with versions 40, 43 and 46, remove clamp bolt and, by pulling it gently, remove Diode Bridge

-) Insert an adequate puller to pull out exciter rotor

-) Pull out rotor from the drive-end side; should the front lead diameter be smaller than the impeller's external diameter, remove lid to pull out rotor

-) Use a pair of suitable pliers to remove seeger rings

-) Use a suitable puller to remove bearing



## MANUTENZIONE

-) per il montaggio del nuovo cuscinetto, riscaldare lo stesso con un apposito dispositivo magnetico

-) indossando gli appositi guanti anti-scottatura, montare il cuscinetto nella sua sede

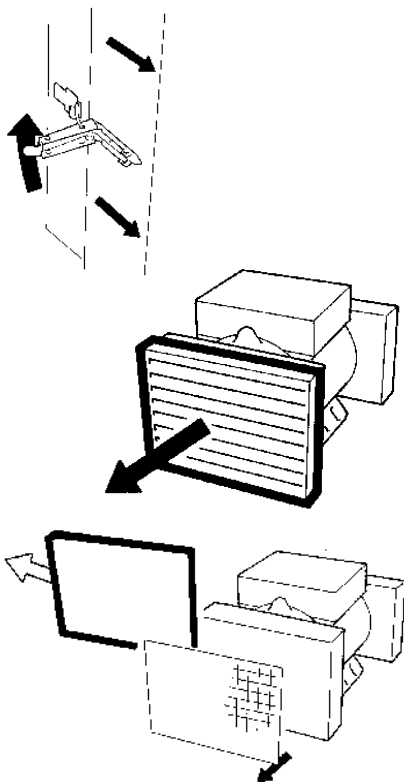
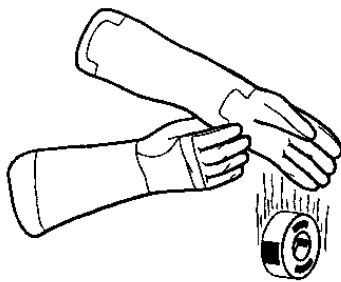
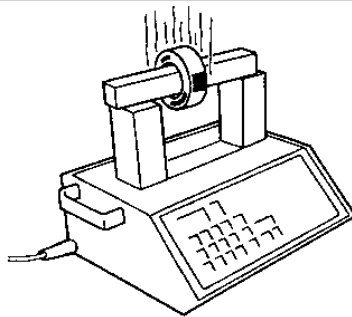
### b) Pulizia dei filtri aria (se presenti)

I filtri aria sono degli accessori che vengono montati su richiesta dei clienti; tali dispositivi devono essere periodicamente puliti in quanto al loro interno è situata una retina a maglie che deve essere mantenuta pulita per garantire l'efficienza del filtro. La periodicità di intervento sui filtri aria dipenderà dalla severità delle condizioni del luogo di installazione; in ogni caso una regolare ispezione di questi componenti permetterà di stabilire se sarà il caso di intervenire. E' importante ricordare che la pulizia di questi elementi deve essere eseguita con il generatore non in servizio, in quanto la rimozione consente l'accesso a parti che potrebbero trovarsi in tensione.

### c) Pulizia degli avvolgimenti

La durata degli avvolgimenti e quindi del generatore stesso, può essere migliorata da una corretta manutenzione e pulizia; un programma di ispezione e manutenzione dovrebbe essere stabilito tenendo presente che la frequenza di tali verifiche dipenderà dalle condizioni effettive dell'ambiente di utilizzo.

Se il generatore lavora in ambienti asciutti e puliti, un'ispezione all'anno può essere sufficiente; al contrario, se le condizioni sono più severe, è opportuno aumentare la frequenza delle ispezioni.



## MAINTENANCE

-) To insert new bearing, heat it with a suitable magnetic device

-) Put on safety gloves and insert bearing into its place

### b) Cleaning of air filters (if available)

Air filters are optional parts that are supplied upon request; these devices must be cleaned on a regular basis; inside these filters there is a mesh net that has to be kept clean in order to ensure a good performance of the filter. The time interval between each cleaning operation depends on the conditions of the installation site. A frequent inspection of these parts will establish if any cleaning is required. Make sure you turn off the generator set when performing cleaning operations of such parts as their removal entails contact with live parts.

### c) Cleaning of windings

Both windings and generator will last longer with a correct maintenance and cleaning; an inspection and a maintenance schedule should be established by keeping in mind that the frequency of these inspections depends on the conditions of the site where the generator is being used.

If the generator is used in a dry and clean environment, an inspection a year is enough; in case of severe conditions, inspections must be carried out more frequently.

## MANUTENZIONE

In ogni caso, indipendentemente dal programma stabilito, raccomandiamo di procedere a tale manutenzione nelle seguenti ipotesi :

- ) presenza di ruggine
- ) segni evidenti di corrosione
- ) deterioramento dell'isolamento
- ) presenza di polvere sulla superficie degli avvolgimenti

Gli avvolgimenti possono essere puliti utilizzando degli appositi solventi come ad esempio "l'acqua regia" o il "solvesso"; tali sostanze, avendo un alto grado di evaporazione, permettono una pulizia adeguata senza intaccare il grado di isolamento degli avvolgimenti.

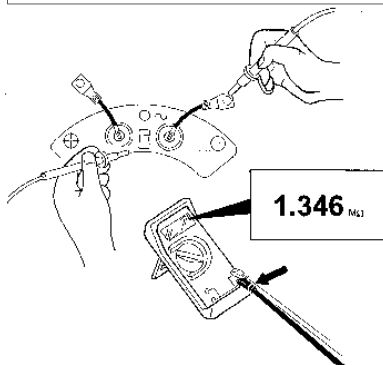
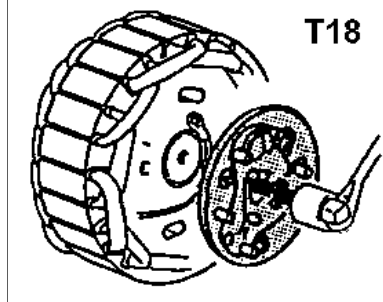
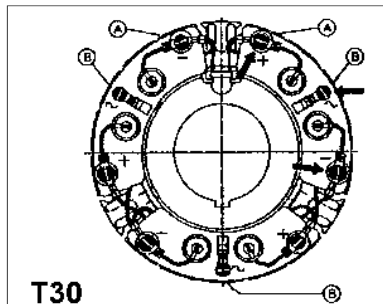
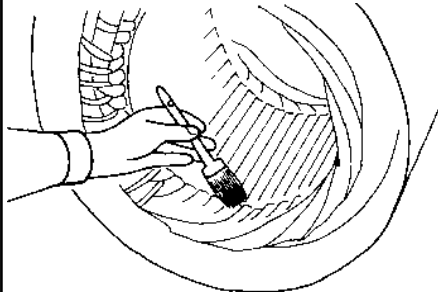
A pulizia ultimata, raccomandiamo di controllare che non vi siano segni di sovrariscaldamenti ed eventuali tracce di carbonizzazioni.

Inoltre si consiglia di asciugare gli avvolgimenti a circa 60-80°C e se si notano degradamenti della vernice degli avvolgimenti, procedere ad una ulteriore verniciatura degli stessi.

### d) Sostituzione del ponte a diodi

A seconda del tipo di alternatore, il ponte a diodi può essere composto o da tre settori separati su ognuno dei quali sono fissati due diodi (T30) oppure da un blocco unico circolare (T18) con sei diodi. La prima configurazione (T30) viene installata nei generatori tipo 34-38 mentre la seconda (T18) viene installata nei generatori tipo 40-43-46.

Ciascun singolo diodo può essere verificato molto facilmente con un multimetro; è sufficiente scollegare il cavetto del diodo in esame e controllarne la resistenza nei due sensi. Un diodo che funziona correttamente indicherà una resistenza molto alta in un senso e molto bassa nel senso opposto. Un diodo guasto avrà o una resistenza molto bassa o una resistenza infinita in entrambi i sensi. Una volta sostituito il settore o l'intero ponte vi raccomandiamo di serrare le relative viti con le corrette coppie di fissaggio e di rispettare le polarità secondo gli schemi e le tabelle forniti da Mecc Alte.



## MAINTENANCE

However, we recommend that a check should be done, regardless of the schedules, in the following cases:

- ) in case of rust
- ) in case of corrosion
- ) when the insulation is damaged
- ) when there is dust on the surface of the windings

To clean windings, use solvents like oil of turpentine or "Solvesso" solvent. Cleaning with such substances, which contain a high evaporation level, will not damage the isolation level of the windings. When cleaning is over, please look out for any overheating or carbonisation signs.

We also recommend drying up of windings at 60-80°C and if you notice that the varnish of windings is not in good shape, then have them varnished again.

### d) Replacement of diode bridge

The diode bridge varies according to the model of the generator. It can have three separate sectors with two diodes fixed on each sector (T30), or one circular body (T18) with 6 diodes. The first type (T30) is used in the alternator models 34-38, whereas the second one (T18) is used in the 40,43 and 46 versions.

Diodes can be easily inspected with a multimeter: simply disconnect the wire of the particular diode and check its resistance on both directions. A perfectly functioning diode will show a very high resistance in one direction and a very low resistance in the opposite direction. A faulty diode will show either a very low resistance, or an infinite resistance in both directions. Once the whole sector, or the whole bridge, is replaced, remember to tighten the screws with a suitable tightening wrench and to strictly comply with the polarities and the diagrams indicated by Mecc Alte.

## MANUTENZIONE

### Generatore tipo 28-31-32. Procedura di verifica per diodi rotore eccitatrice.

Strumentazione necessaria :

- batteria 12V
- lampada 12V-21W (o in alternativa resistenza 6.8Ω-30W)
- voltmetro (Ex. Multimetro su scala VOLT d.c.)

**Importante: Prima di eseguire le operazioni seguenti sconnettere i due cavi di collegamento del rotore principale al ponte diodi (+ e -).**

#### TEST DEI DIODI SUL "NEGATIVO"

- Connettere gli strumenti come indicato in figura A (tabella 26 pag. 74)
- Fissare il cavo connesso alla lampada al morsetto negativo del ponte come indicato in figura A (tabella 26 pag. 74)
- Connettere il terminale "Probe" ai punti A1, A2 ed A3 in sequenza per verificare rispettivamente i diodi 1, 2 e 3. Verificare la lettura sul voltmetro in relazione a quanto indicato in tabella (tabella 26 pag. 74).

#### TEST DEI DIODI SUL "POSITIVO"

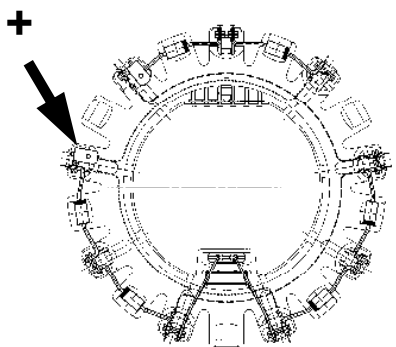
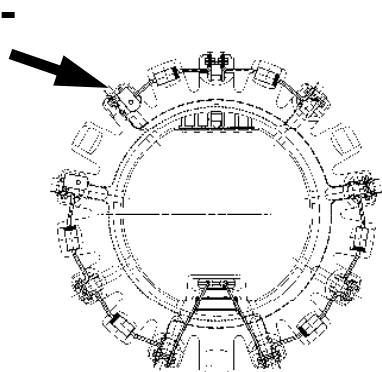
- Connettere gli strumenti come indicato in figura B (tabella 26 pag. 74)
- Fissare il cavo connesso al negativo della batteria al morsetto positivo del ponte come indicato in figura B (tabella 26 pag. 74)
- Connettere il terminale "Probe" ai punti A4, A5 e A6 in sequenza per verificare rispettivamente i diodi 4, 5 e 6; verificare la lettura sul voltmetro in relazione a quanto indicato in tabella (tabella 26 pag. 74).

#### ISTRUZIONI PER LA SOSTITUZIONE DEL DIODO.

Qualora i valori riscontrati indichino un diodo danneggiato, occorrerà procedere alla sostituzione del componente.

A tale scopo si raccomanda di non estrarre i reofori dalle rispettive sedi ma di tagliarli in prossimità del corpo del componente; inserire il nuovo componente rispettando le polarità e saldare a stagno accuratamente i reofori con gli spezzoni rimasti nelle sedi.

**IMPORTANTE  
IMPORTANT  
WICHTIG**



## MAINTENANCE

### Generator versions: 28-31-32. Procedure to check the diodes of the exciter rotor.

Necessary equipment :

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

**Warning: 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 (table 26 page 74)
- Fix the cable connected to the lamp to the negative terminal of the bridge, as it is pointed out in the picture A (table 26 page 74)
- Connect the terminal "Probe" to the point A1 (it is checked the diode 1), then to the point A2 (it is checked the diode 2) and finally to the point A3 (it is checked the diode 3); check the readings on the voltmeter in relation with what is reported on the table (table 26 page 74).

#### TEST OF THE DIODES ON THE "POSITIVE"

- Connect the equipment, as it is pointed out in the picture B (table 26 page 74)
- 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 (table 26 page 74)
- Connect the terminal "Probe" to the point A4 (it is checked the diode 4), then to the point A5 (it is checked the diode 5) and finally to the point A6 (it is checked the diode 6); check the readings on the voltmeter in relation with what is reported on the table (table 26 page 74).

#### INSTRUCTIONS TO REPLACE THE DIODE

When the values measured point out a diode damaged, it is necessary to replace the component.

For this purpose it is recommended to not pull the rheophores out from their locations, but to cut them near to the body of the component; then fit in the new component respecting the polarity and soft-solder accurately the rheophores with the pieces remained in their locations.

## MANUTENZIONE

### e) Sostituzione dell'eccitatrice Generatore tipo 28-31-32-34.

Per smontare l'eccitatrice dell'alternatore della serie 28-31-32-34, attenersi alle seguenti istruzioni :

-) togliere il coperchio anteriore

-) sfilare il rotore utilizzando un mezzo di sollevamento con funi morbide ma di portata adeguata; verificare che i mezzi di sollevamento predisposti siano comunque adeguati per i pesi dei componenti da movimentare

-) per estrarre il cuscinetto deve essere utilizzato un apposito estrattore

-) per smontare il rotore eccitatrice, inserire un adeguato estrattore facilmente costruibile o reperibile presso la nostra sede.

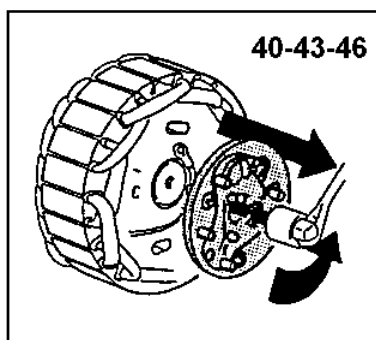
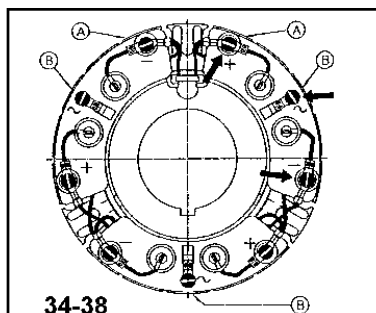
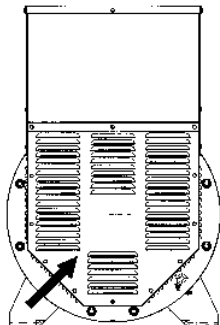
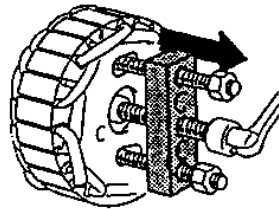
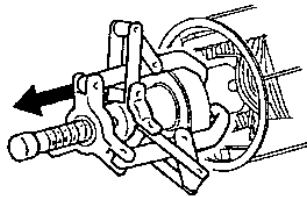
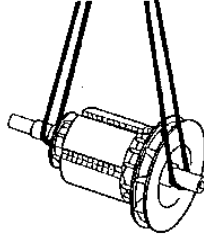
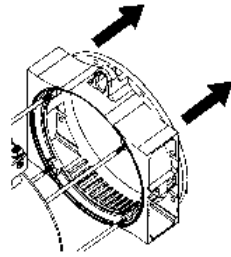
### Generatore tipo 38-40-43-46.

Per smontare l'eccitatrice dell'alternatore della serie 38-40-43-46, non è necessario smontare l'intero alternatore, pertanto attenersi alle seguenti istruzioni:

-) togliere la chiusura posteriore

-) sconnettere i cinque fili del ponte diodi rotante

-) nel caso di alternatori della serie 38, togliere le viti di bloccaggio dei settori mentre nel caso di alternatori della serie 40-43-46 togliere il bullone di bloccaggio e tirando leggermente togliere il ponte diodi



## MAINTENANCE

### e) Replacement of exciter Generator versions: 28-31-32-34

Follow these instructions to remove exciter of the 28-31-32-34 versions:

-) remove front lead

-) Use a lifting device equipped with soft ropes of an adequate lifting capacity to extract rotor. Make sure that the lifting devices are suitable for the weight of the parts to be shifted

-) Use a puller to pull out bearing

-) To remove the exciter rotor, use a suitable puller, which can be easily constructed or forwarded by the manufacturer upon request.

### Generator versions: 38-40-43-46.

To remove exciter of the 38-40-43-46 versions, there is no need to disassemble the entire generator, however, you must follow the instructions below:

-) Remove rear seal

-) Disconnect the five wires of the rotating diode bridge

-) When dealing with the 38 versions, remove clamp screws from sectors; whilst when dealing with the 40-43-46 versions, remove clamp bolt and, by pulling it gently, pull out diode bridge

## MANUTENZIONE

-) per smontare il rotore eccitatrice, inserire un adeguato estrattore facilmente costruibile o reperibile presso la nostra sede

### f) Sostituzione del regolatore di tensione

I generatori sono provvisti di regolatore automatico di tensione; a seconda del tipo di alternatore, i regolatori elettronici possono essere di due tipi : SR7/2-G, UVR6/1-F.

L'SR7/2-G è montato di serie nelle tipologie 28-31-32-34, l'UVR6/1-F è montato nelle tipologie 38-40-43-46.

Nel caso in cui si riscontrassero dei comportamenti anomali vi preghiamo di consultare il manuale specifico o di contattare il nostro servizio di assistenza tecnica.

Una volta stabilito che il regolatore deve essere sostituito, procedere come segue :

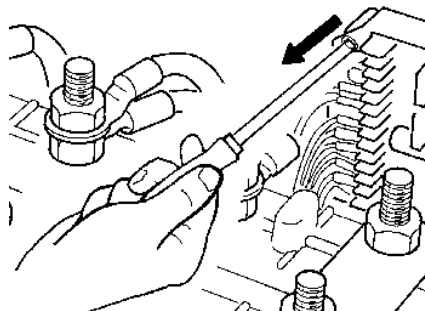
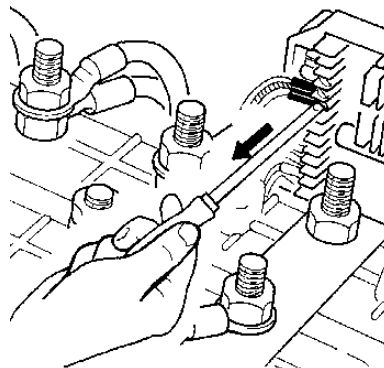
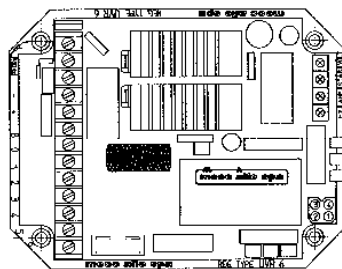
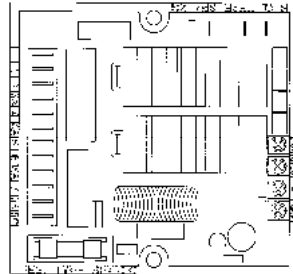
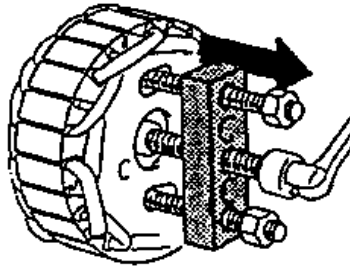
-) scollegare tutti i cavetti di collegamento in morsettieria

-) svitare le 2/4 viti di bloccaggio del regolatore

-) collocare il nuovo regolatore nella posizione prevista

-) fissare il nuovo regolatore con le viti precedentemente raccolte

-) ricollegare tutti i cavi alla morsettieria del regolatore, servendosi in caso di bisogno, degli schemi forniti da Mecc Alte.



## MAINTENANCE

-) To insert exciter rotor, use a suitable puller, which can be easily constructed or forwarded by the manufacturer upon request.

### f) Replacement of voltage regulator

All generators are equipped with an automatic voltage regulator; depending on the alternator model, electronic regulators can be of two different types: SR7/2-G, UVR6/1-F.

The SR7/2-G is an integral part of the 28-31-32-34 generators; the UVR6/1-F is supplied with the 38-40-43 and 46 versions. Should some anomalous functioning be detected, please consult our technical manual or contact our technical assistance service.

Once it has been ascertained that the regulator needs to be replaced, proceed as follows:

-) Disconnect all terminal board wires

-) Unscrew the 2/4 clamp screws of the regulator

-) Set new regulator in the usual position

-) Tighten the new regulator with the previously unscrewed screws

-) Connect again all wires to the terminal board of the regulator. Follow diagrams supplied by Mecc Alte, if necessary.

## MANUTENZIONE

### g) Controllo della tensione residua

La seguente procedura è applicabile ai generatori muniti di regolatore elettronico e deve essere applicata nell'eventualità che il generatore non si autoecciti (in tale condizione, pur ruotando alla velocità nominale, non è presente tensione nella morsettiera principale del generatore):

-) con il generatore fermo, rimuovere il coperchio di chiusura della scatola morsetti

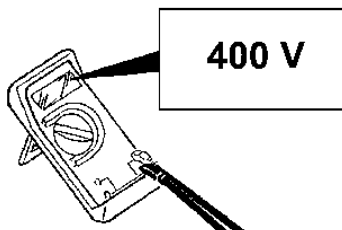
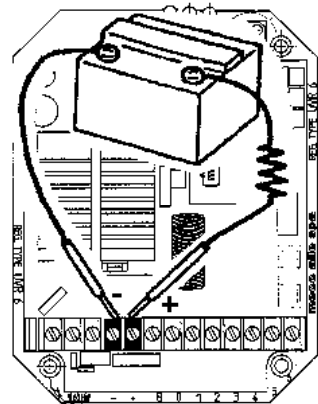
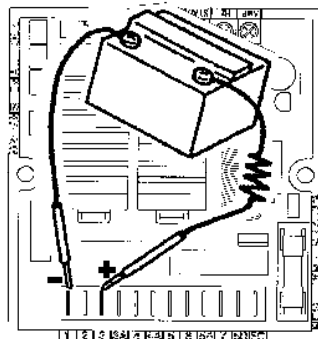
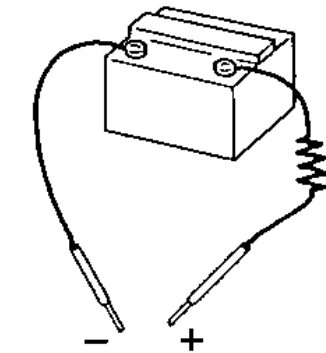
-) predisporre due terminali collegati ad una batteria da 12 Vdc con in serie una resistenza da 30  $\Omega$

-) individuare con l'ausilio degli schemi elettrici forniti da Mecc Alte, i morsetti "+" e "-" del regolatore elettronico

-) avviare il generatore

-) applicare per un istante i due terminali ai morsetti precedentemente individuati facendo molta attenzione nel rispettare le polarità (morsetto "+" del regolatore con morsetto "+" della batteria, morsetto "-" del regolatore con morsetto "-" della batteria)

-) verificare con un voltmetro o con la relativa strumentazione da quadro, che il generatore generi la tensione nominale prevista nella targhetta.



## MAINTENANCE

### g) Check of residual voltage

For generators equipped with an electronic regulator, you must perform the following procedure. This must be applied to ensure that the generator is not over-excited (in such a condition, though it still rotates at nominal velocity, no voltage is present in the generator's main terminal board):

-) When the generator is switched off, remove lid from the terminals case

-) Connect two connecting wires to a 12 Vdc battery with a 30 $\Omega$  in-series resistance

-) Follow the electrical diagrams supplied by Mecc Alte, to locate positive and negative terminals of electronic regulator

-) Start generator

-) Connect, only for a moment, the two connecting wires to the previously located terminals. Make sure to match polarities (positive terminal of regulator with positive terminal of battery, negative terminal of regulator with negative terminal of battery)

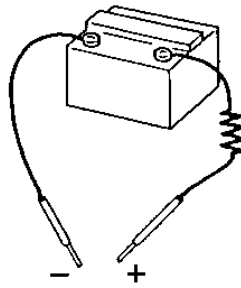
-) Use a voltmeter or the right instrument panel, to check whether the generator is producing the nominal voltage indicated on the plate.

## ANOMALIE E RIMEDI

## DEFECTS AND REMEDIES

### IL GENERATORE NON SI ECCITA

- Controllare il fusibile.
- Aumentare la velocità del 15%.
- Applicare per un istante al "+" e al "-" del regolatore elettronico, una tensione di 12 V di una batteria con in serie una resistenza di 30 Ω rispettando le polarità.



### ALTERNATOR DOES NOT EXCITE

- Substitute fuse.
- Increase speed by 15%.
- For an instant apply on "+" and "-" of the electronic regulator a 12 V battery voltage with a 30 Ω resistor in series, respecting the polarities.

### DOPO ECCITATO SI DISECCITA

- Controllare i cavi di collegamento servendosi dei disegni allegati.

### AFTER BEING EXCITED ALTERNATOR DOES NOT EXCITE

- Check connection cables as per attached drawings.

### A VUOTO TENSIONE BASSA

- Ritarare la tensione.
- Controllare il numero di giri.
- Controllare gli avvolgimenti.

### LOW VOLTAGE AT NO LOAD

- Reset voltage potentiometer.
- Check speed.
- Check windings.

### A VUOTO TENSIONE TROPPO ALTA

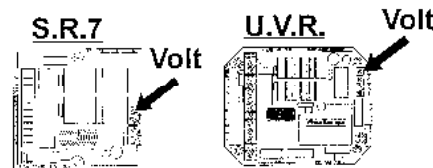
- Ritarare la tensione.
- Sostituire il regolatore.

### HIGH VOLTAGE AT NO LOAD

- Reset voltage potentiometer.
- Substitute regulator.

### A CARICO TENSIONE INFERIORE ALLA NOMINALE

- Ritarare la tensione.
- Corrente troppo alta,  $\cos \varphi$  inferiore a 0.8, velocità inferiore del 4% della nominale.
- Sostituire il regolatore.
- Controllare i diodi scollegando i cavi.



### AT LOAD CONDITIONS, VOLTAGE LOWER THAN RATED VALUE

- Reset voltage potentiometer.
- Current too high, power factor lower than 0.8, speed lower than 4% of rated speed.
- Substitute regulator.
- Check diodes, disconnect cables.

### A CARICO TENSIONE SUPERIORE ALLA NOMINALE

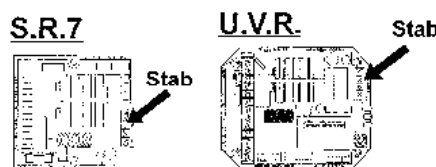
- Ritarare la tensione.
- Sostituire il regolatore.

### AT LOAD CONDITIONS, VOLTAGE HIGHER THAN RATED VOLTAGE

- Reset voltage potentiometer.
- Substitute regulator.

### TENSIONE INSTABILE

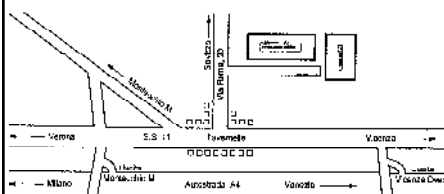
- Controllare uniformità di rotazione.
- Regolare la stabilità del regolatore agendo sul potenziometro "STAB".



### UNSTABLE VOLTAGE

- Check uniformity of rotation.
- Regulate stability of regulator by acting on "STAB." potentiometer.

Per qualsiasi altra anomalia rivolgersi al rivenditore, ai centri di assistenza autorizzati o direttamente alla Mecc Alte.



For any other defect, please contact the seller, the after-sales service or Mecc Alte directly.





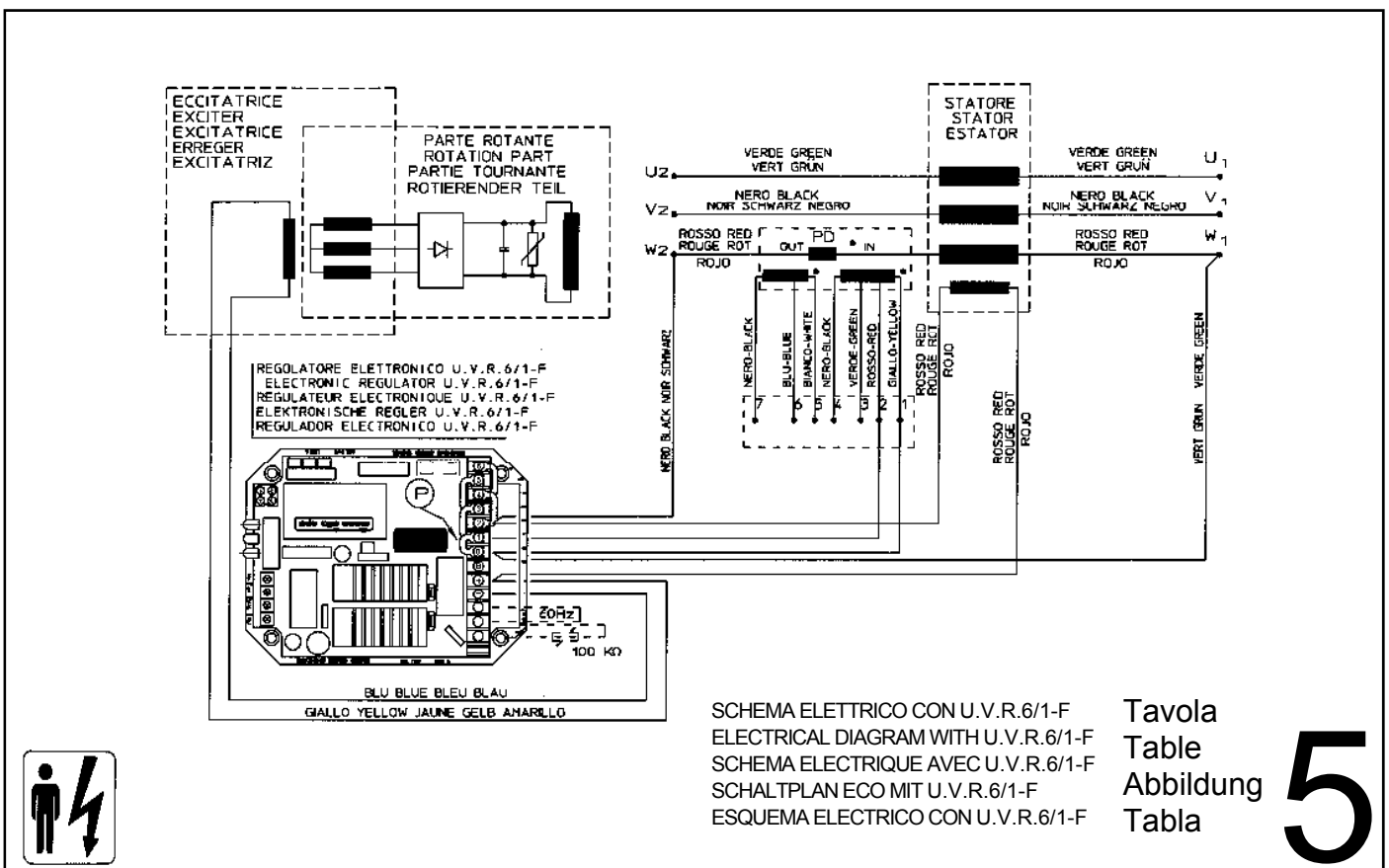
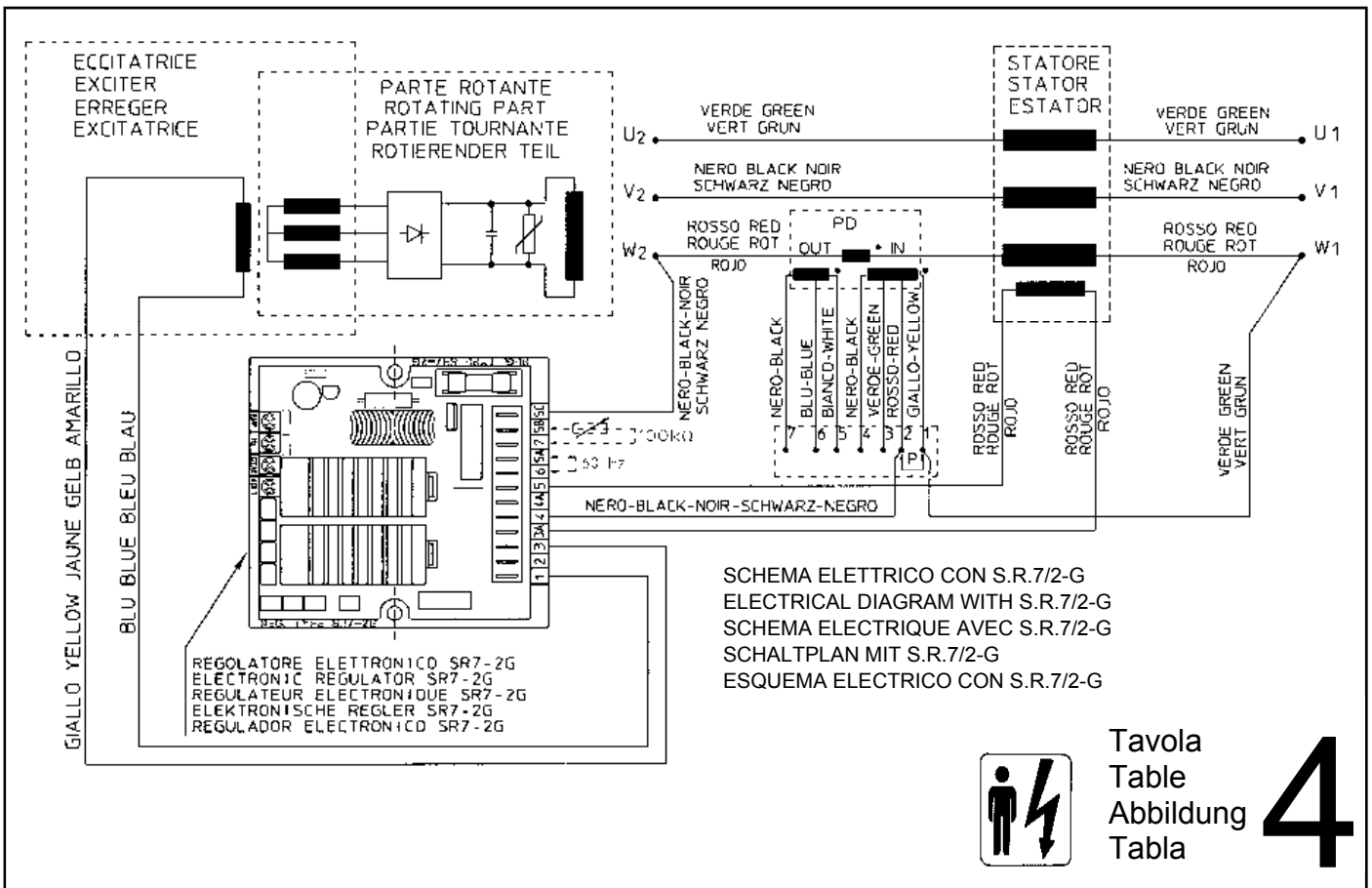
**GENERATORI 4 POLI - 4 POLE GENERATORS - ALTERNATEURS 4 POLES**  
**GENERATOREN 4 POLIG - GENERADORES 4 POLOS**

TIPO TYPE TYP	V / Hz	GENERATORE GENERATOR			ECCITATRICE EXCITER	
		PARTIE PUISSANCE GENERADORES			EXCITATRICE ERREGER	
		STATORE STATOR 1-2  Ω	ROTORE ROTOR  Ω	AVVOLGIMENTO AUSILIARIO AUXILIARY WINDING HILFS WICKLUNG BOBINADO AUXILIAR Ω	STATORE STATOR  Ω	ROTORE FASE-FASE ROTOR PHASE-PHASE  Ω
ECP 28 1VS	115/200/230/400-50	0,951	0,911	3,753	10,60	0,417
ECP 28 2VS	115/200/230/400-50	0,582	1,032	3,225	10,60	0,417
ECP 28 0S	115/200/230/400-50	0,430	1,13	2,957	10,60	0,417
ECP 28 S	115/200/230/400-50	0,283	1,260	4,060	10,60	0,417
ECP 28 1L	115/200/230/400-50	0,198	1,396	2,250	10,60	0,417
ECP 28 2L	115/200/230/400-50	0,128	1,670	2,150	10,60	0,417
ECP 28 VL	115/200/230/400-50	0,106	1,860	2,170	10,60	0,417
ECO 32 2S	115/200/230/400-50	0,097	2,010	1,098	10,60	0,417
ECO 32 3S	115/200/230/400-50	0,078	2,163	0,929	10,60	0,417
ECO 32 1L	115/200/230/400-50	0,061	2,473	0,993	11,35	0,442
ECO 32 2L	115/200/230/400-50	0,041	2,861	0,909	11,35	0,442
ECO 32 3L	115/200/230/400-50	0,035	3,171	0,790	11,35	0,442
ECP 34 1.5VS	115/200/230/400-50	0,045	2,248	1,04	15,28	0,410
ECP 34 1S	115/200/230/400-50	0,030	2,477	1,43	15,28	0,410
ECP 34 2S	115/200/230/400-50	0,020	2,951	1,35	15,28	0,410
ECP 34 1L	115/200/230/400-50	0,018	3,165	1,18	15,28	0,410
ECP 34 2L	115/200/230/400-50	0,015	3,577	1,05	15,28	0,410
ECP 34 3L	115/200/230/400-50	0,015	4,35	0,855	15,28	0,410
ECO 38 1SN	115/200/230/400-50	0,0130	3,905	0,854	15,28	0,685
ECO 38 2SN	115/200/230/400-50	0,0105	4,133	0,845	15,28	0,685
ECO 38 3SN	115/200/230/400-50	0,0085	4,449	0,778	15,28	0,685
ECO 38 1LN	115/200/230/400-50	0,0065	4,887	0,796	15,28	0,685
ECO 38 2LN	115/200/230/400-50	0,0055	5,604	0,751	15,28	0,685
ECO 38 3LN	115/200/230/400-50	0,0042	6,780	0,700	15,28	0,685
ECO 40 1S	115/200/230/400-50	0,0048	4,488	0,558	8,85	0,317
ECO 40 2S	115/200/230/400-50	0,0074	4,881	0,521	8,85	0,317
ECO 40 3S	230/400/460/800-50	0,0106	5,176	0,540	8,85	0,317
ECO 40 1L	115/200/230/400-50	0,0055	6,025	0,476	8,85	0,317
ECO 40 1.5L	230/400/460/800-50	0,0087	1,376	0,550	8,85	0,050
ECO 40 2L	115/200/230/400-50	0,0042	1,500	0,481	8,85	0,050
ECO 40 VL	230/400/460/800-50	0,0104	1,592	0,300	8,85	0,050
ECO 43 1SN	230/400/460/800-50	0,0109	2,100	0,440	10,63	0,130
ECO 43 2SN	230/400/460/800-50	0,0086	2,300	0,413	10,63	0,130
ECO 43 1LN	230/400/460/800-50	0,0078	2,500	0,713	10,63	0,130
ECO 43 2LN	230/400/460/800-50	0,0058	2,800	0,677	10,63	0,130
ECO 43 VL	230/400/460/800-50	0,0046	2,886	0,40	10,63	0,130
ECO 46 1S	230/400/460/800-50	0,0057	3,050	0,414	12,90	0,120
ECO 46 1.5S	230/400/460/800-50	0,0034	3,319	0,35	12,90	0,120
ECO 46 2S	230/400/460/800-50	0,0039	3,500	0,330	12,90	0,120
ECO 46 1L	230/400/460/800-50	0,0032	3,977	0,360	12,90	0,120
ECO 46 1.5L	230/400/460/800-50	0,0027	4,27	0,40	12,90	0,120
ECO 46 2L	230/400/460/800-50	0,0024	4,500	0,390	12,90	0,120

**GENERATORI 2 POLI - 2 POLE GENERATORS - ALTERNATEURS 2 POLES**  
**GENERATOREN 2 POLIG - GENERADORES 2 POLOS**

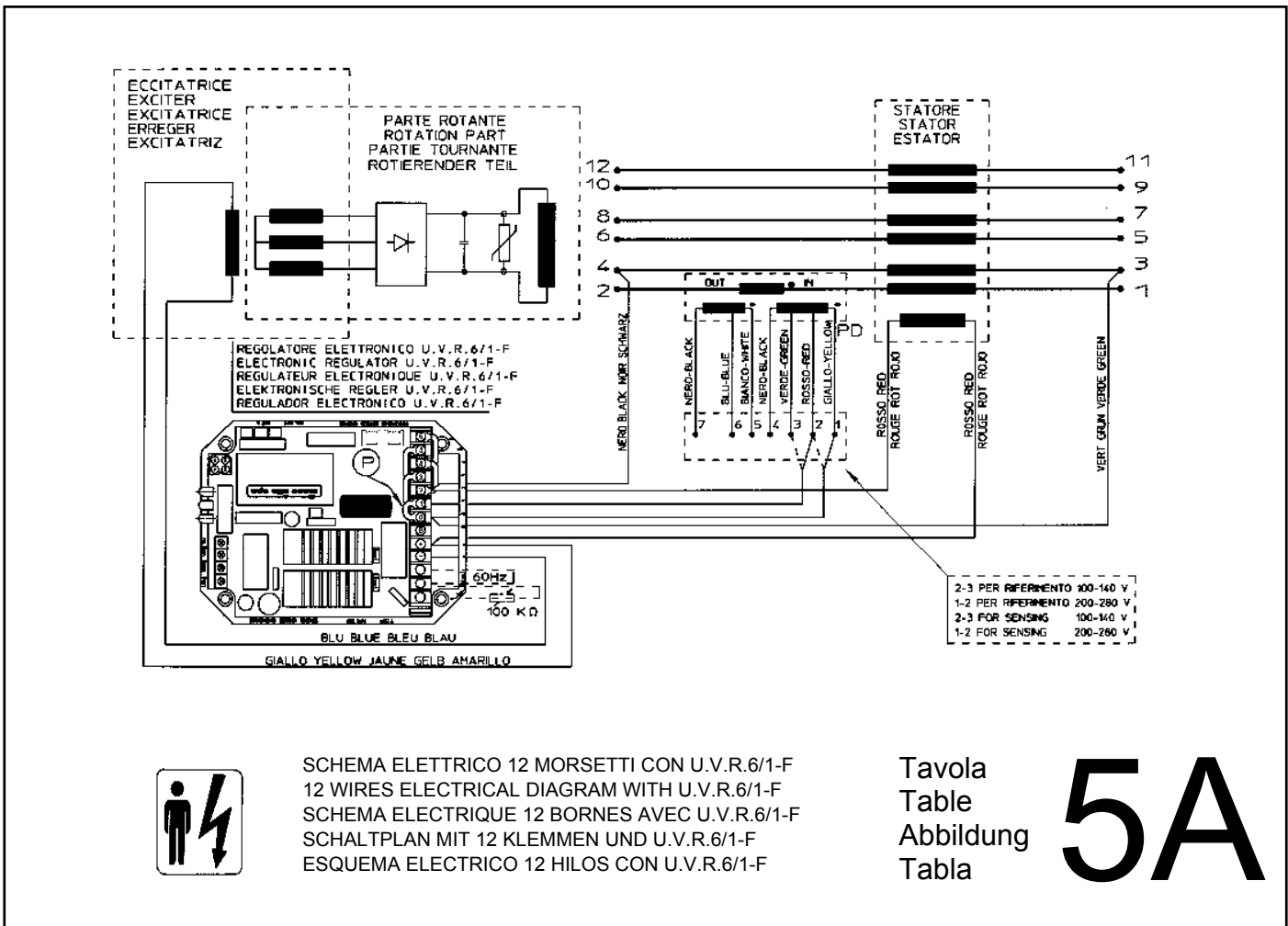
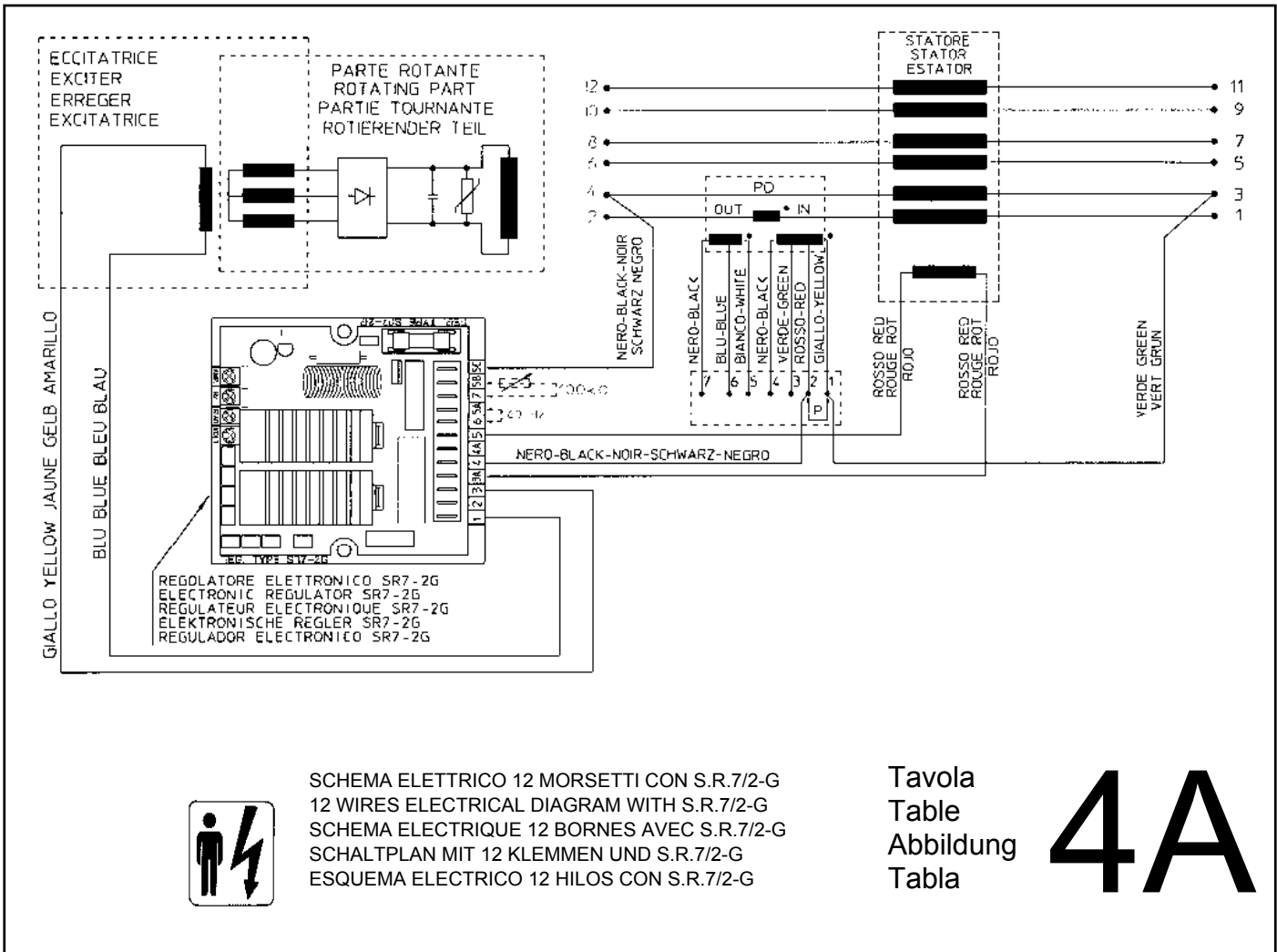
ECP 28 1L	115/200/230/400-50	0,1480	4,877	2,706	10,60	0,417
ECP 28 2L	115/200/230/400-50	0,0863	5,523	1,173	10,60	0,417
ECP 28 3L	115/200/230/400-50	0,0860	5,848	1,087	10,60	0,417
ECP 28 VL	115/200/230/400-50	0,056	6,500	0,690	10,60	0,417
ECO 31 2SN	115/200/230/400-50	0,110	3,650	1,553	10,60	0,417
ECO 31 3SN	115/200/230/400-50	0,046	4,071	1,403	10,60	0,417
ECO 31 1LN	115/200/230/400-50	0,043	4,301	1,358	11,35	0,475
ECO 31 2LN	115/200/230/400-50	0,034	4,680	1,141	11,35	0,475

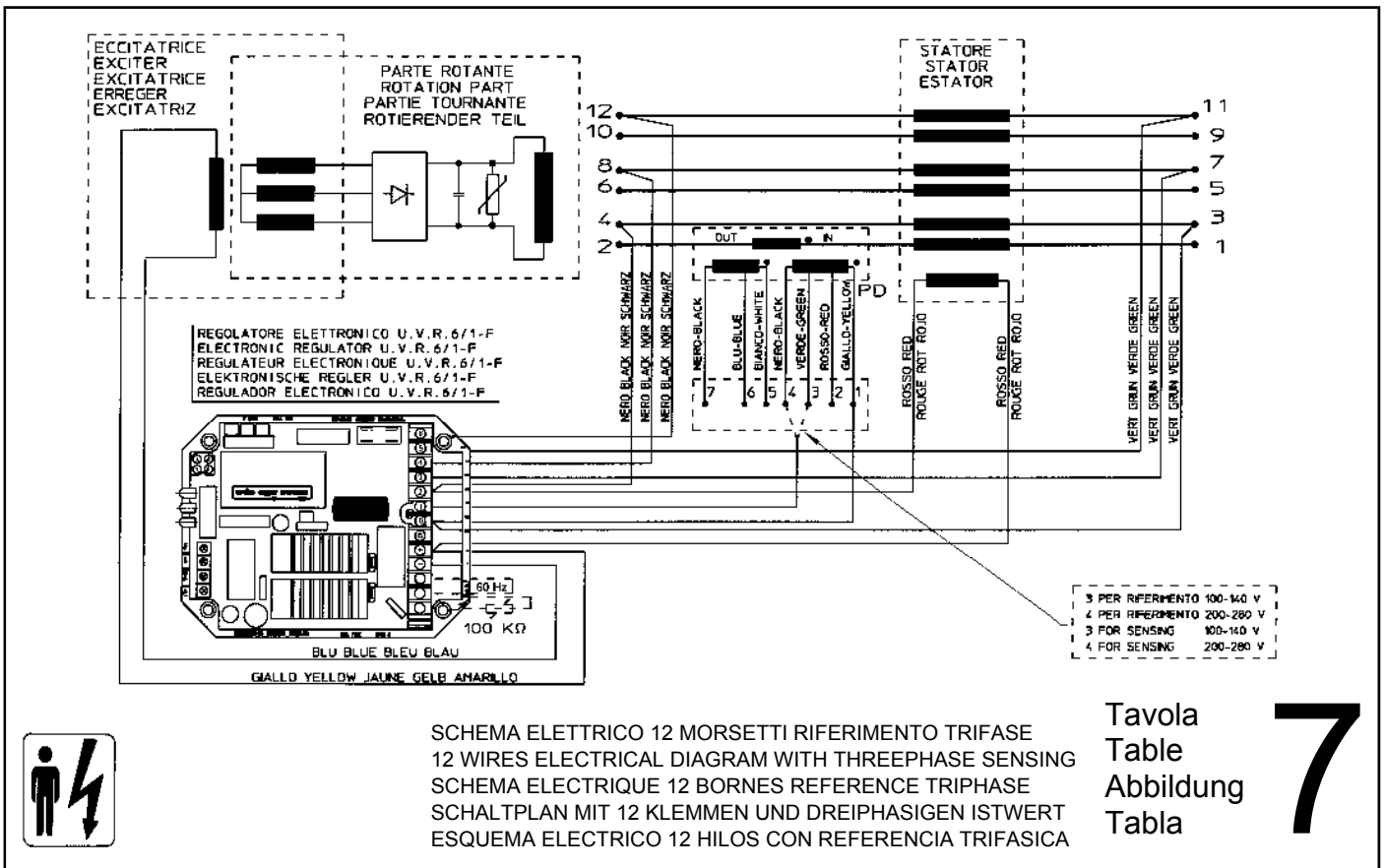
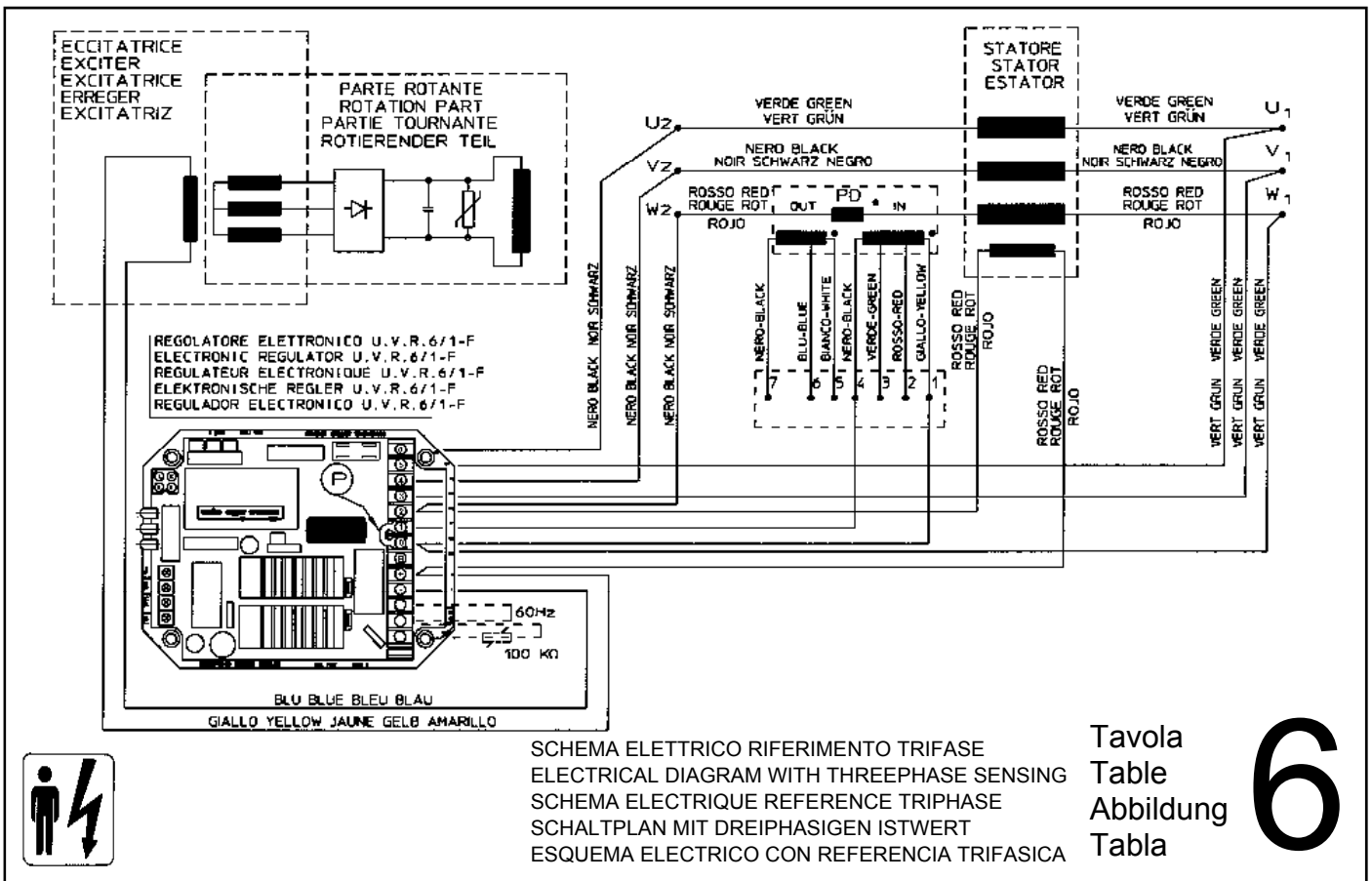




Note : Il dispositivo di parallelo PD è opzionale fino a 350 kVA.  
 Il ponticello P abilita o disabilita il dispositivo di parallelo se presente.  
 The parallel device PD is optional up to 350 kVA.  
 The link P activates or de-activates the parallel device, if it is present.  
 Le dispositif de parallele PD est en option jusqu'à 350 kVA.  
 Le pont P met ou supprime le circuit du dispositif de parallele.  
 Die Parallelvorrichtung PD ist bis zu 350 kVA optional.  
 Die Brücke P deaktiviert die Parallelvorrichtung, sofern vorhanden.  
 El dispositivo de paralelo PD es opcional hasta 350 kVA.  
 El puentecillo P, si esta presente, activa o desactiva el dispositivo de paralelo.

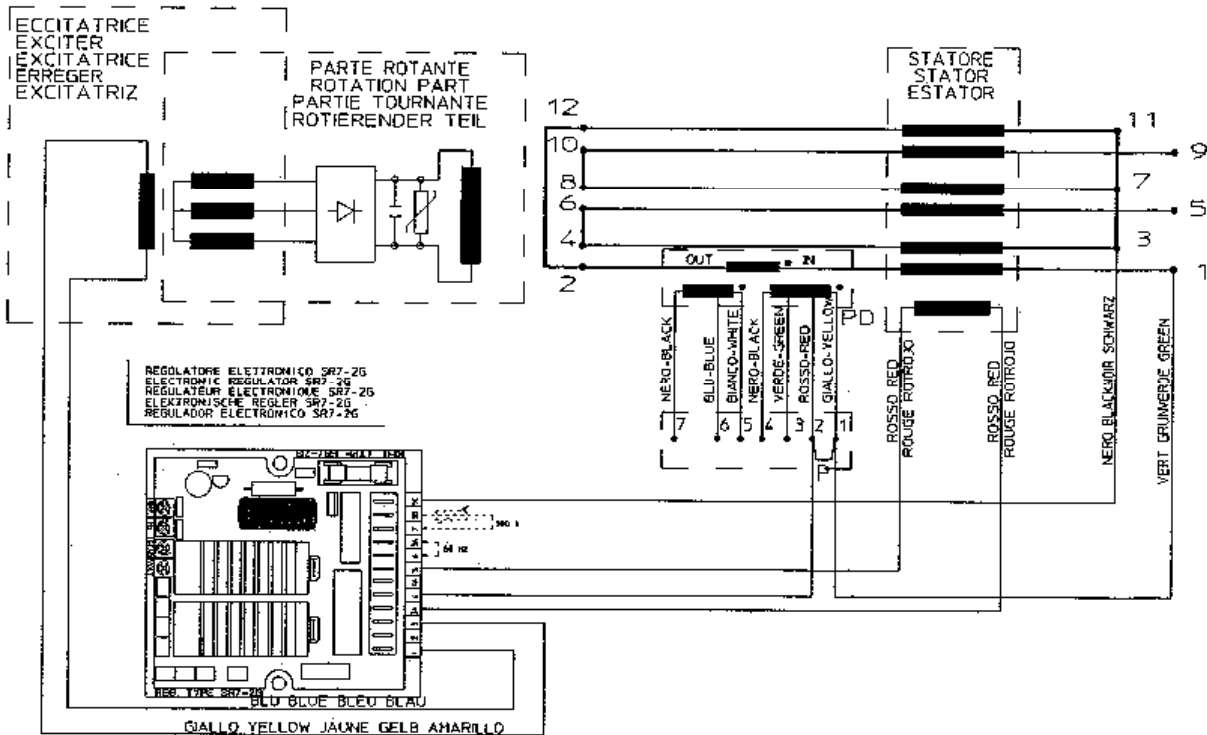




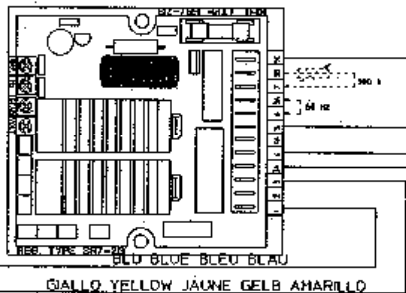


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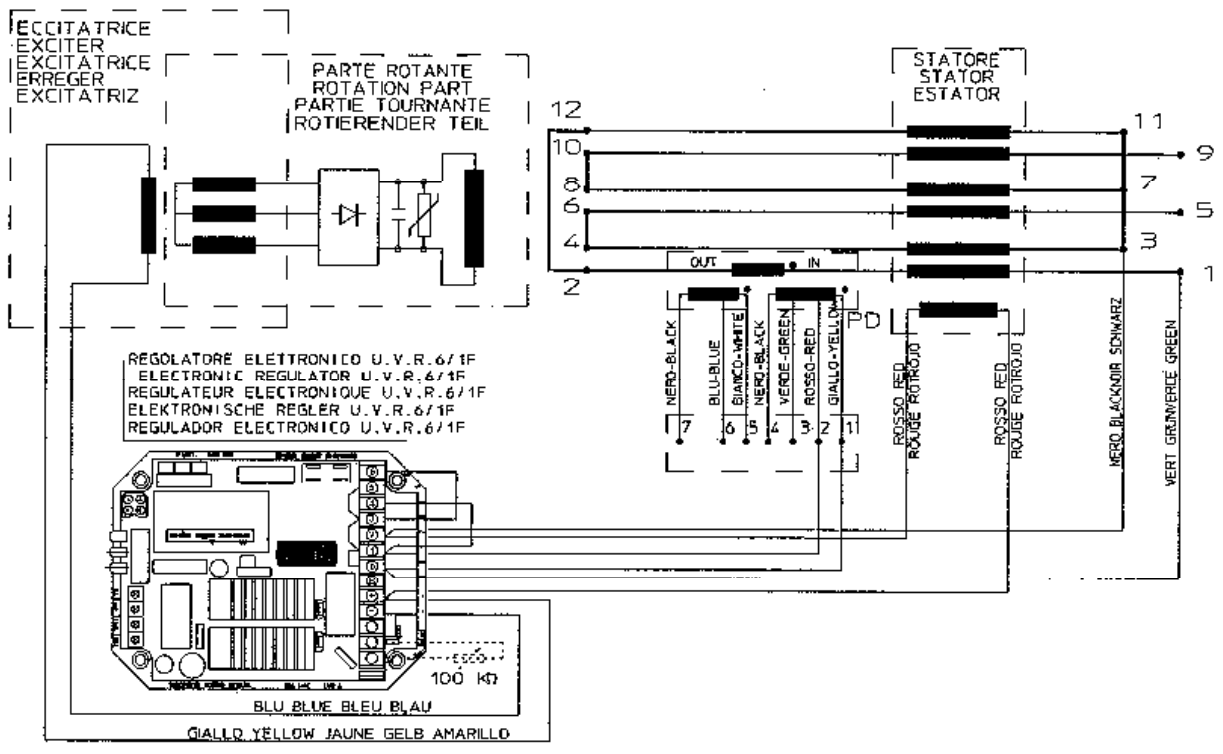
REGOLATORE ELETTRONICO SR7-2G  
ELECTRONIC REGULATOR SR7-2G  
REGULATEUR ELECTRONIQUE SR7-2G  
ELEKTRONISCHE REGLER SR7-2G  
REGULADOR ELECTRONICO SR7-2G



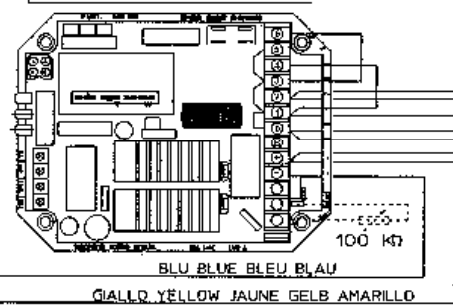
SCHEMA ELETTRICO 12 MORSETTI CON S.R.7/2-G (ZIG-ZAG)  
12 WIRES ELECTRICAL DIAGRAM WITH S.R.7/2-G (ZIG-ZAG)  
SCHEMA ELECTRIQUE 12 BORNES AVEC S.R.7/2-G (ZIG-ZAG)  
SCHALTPLAN MIT 12 KLEMMEN UND S.R.7/2-G (ZIG-ZAG)  
ESQUEMA ELECTRICO 12 HILOS CON S.R.7/2-G (ZIG-ZAG)

Tavola  
Table  
Abbildung  
Tabla

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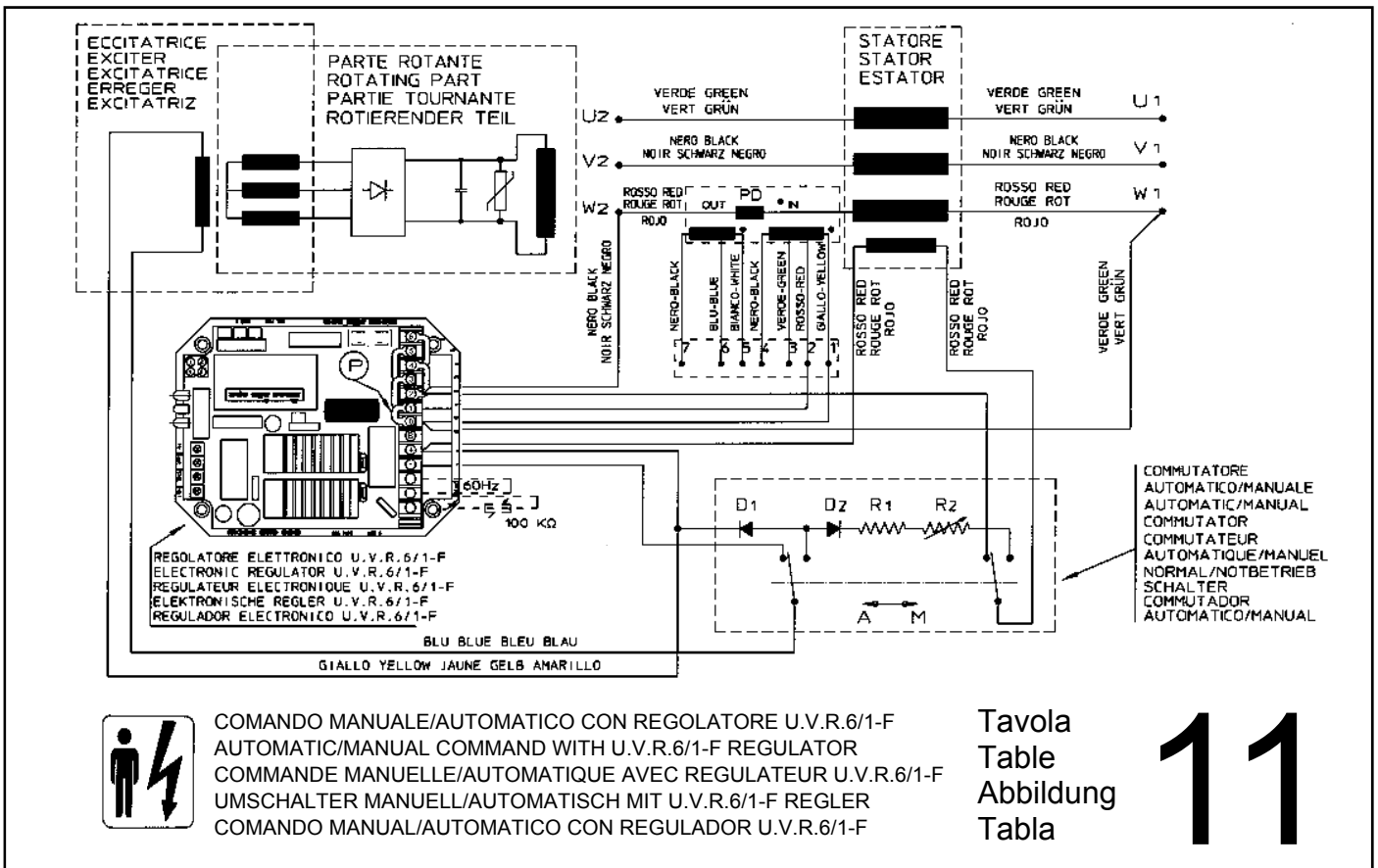
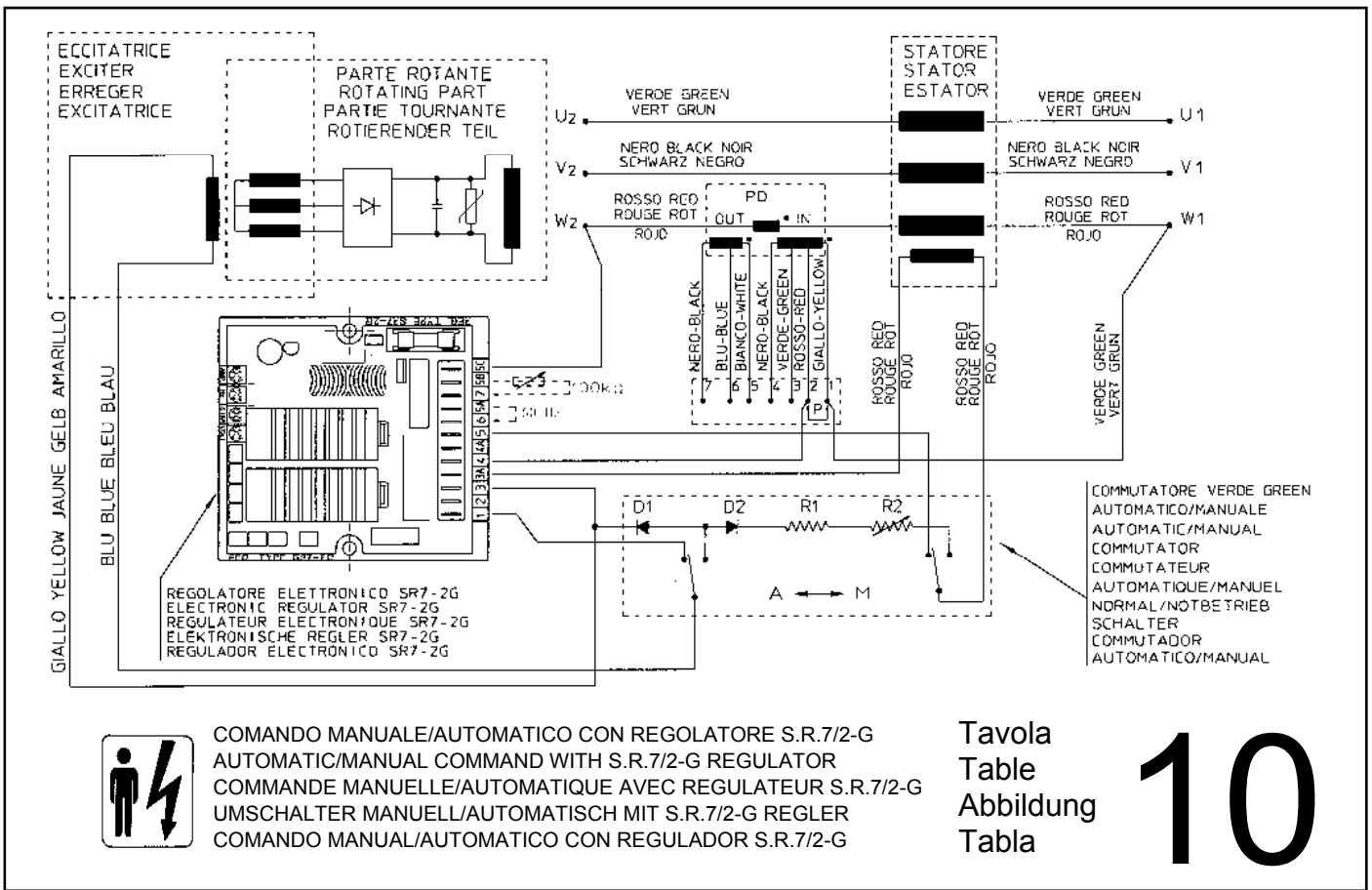
REGOLATORE ELETTRONICO U.V.R.6/1F  
ELECTRONIC REGULATOR U.V.R.6/1F  
REGULATEUR ELECTRONIQUE U.V.R.6/1F  
ELEKTRONISCHE REGLER U.V.R.6/1F  
REGULADOR ELECTRONICO U.V.R.6/1F



SCHEMA ELETTRICO 12 MORSETTI CON U.V.R.6/1-F (ZIG-ZAG)  
12 WIRES ELECTRICAL DIAGRAM WITH U.V.R.6/1-F (ZIG-ZAG)  
SCHEMA ELECTRIQUE 12 BORNES AVEC U.V.R.6/1-F (ZIG-ZAG)  
SCHALTPLAN MIT 12 KLEMMEN UND U.V.R.6/1-F (ZIG-ZAG)  
ESQUEMA ELECTRICO 12 HILOS CON U.V.R.6/1-F (ZIG-ZAG)

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Table  
Abbildung  
Tabla

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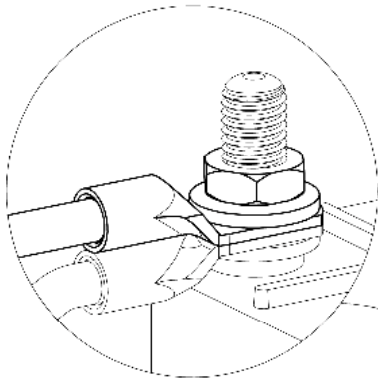
Note : Il dispositivo di parallelo PD è opzionale fino a 350 kVA.  
Il ponticello P abilita o disabilita il dispositivo di parallelo se presente.  
The parallel device PD is optional up to 350 kVA.  
The link P activates or de-activates the parallel device, if it is present.  
Le dispositif de parallele PD est en option jusqu'à 350 kVA.  
Le pont P met ou supprime le circuit du dispositif de parallele.  
Die Parallelvorrichtung PD ist bis zu 350 kVA optional.  
Die Brücke P deaktiviert die Parallelvorrichtung, sofern vorhanden.  
El dispositivo de paralelo PD es opcional hasta 350 kVA.  
El puentecillo P, si esta presente, activa o desactiva el dispositivo de paralelo.



Tavola  
Table  
Abbildung  
Tabla

# 12

COLLEGAMENTO CAVI UTILIZZATORE 28-31-32-34  
USER CABLES CONNECTION 28-31-32-34  
CONNEXION DES CÂBLES PAR L'UTILISATEUR 28-31-32-34  
VERBRAUCHERKABELANSCHLUSS 28-31-32-34  
CONEXIÓN CABLES USUARIO 28-31-32-34



CAVI UTILIZZATORE  
USER CABLES  
UTILISATEUR CABLE  
KABEL BENUTZER  
CABLE DE USUARIO

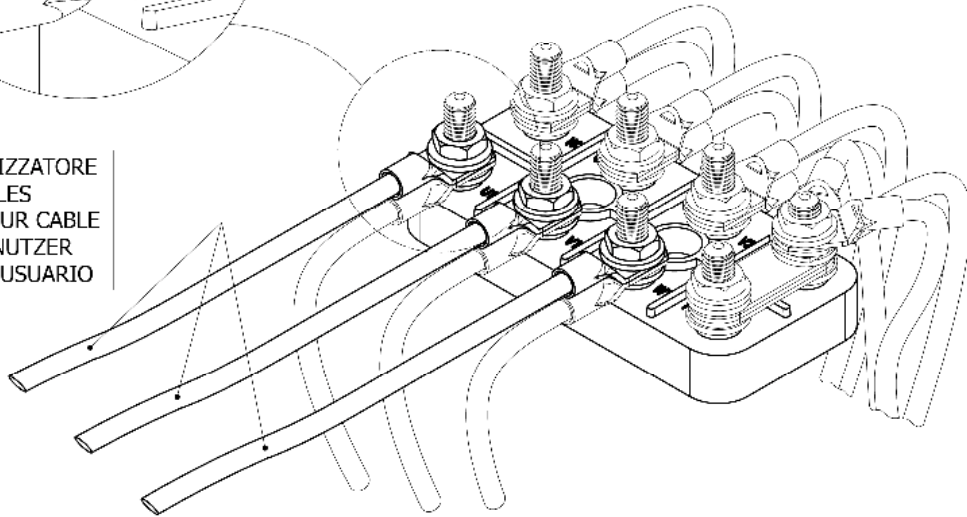
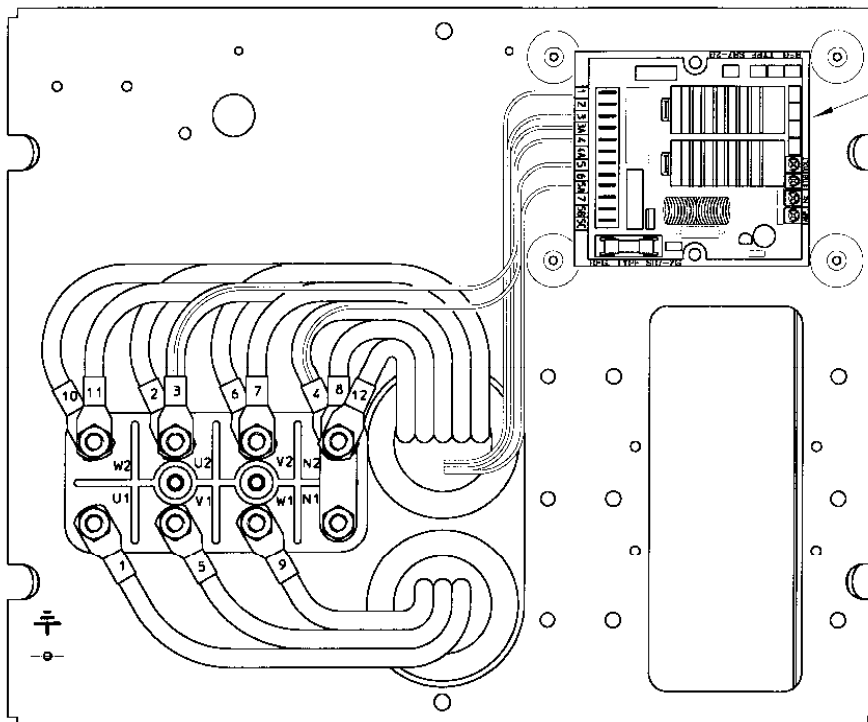


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# 13

SCATOLA REGOLAZIONE 28-31-32  
TERMINAL BOX 28-31-32  
BOITIER DE REGULATION 28-31-32  
REGLERKASTEN 28-31-32  
CAJA DE REGULACION 28-31-32



REGOLATORE ELETTRONICO SR7-25  
ELECTRONIC REGULATOR SR7-25  
RÉGULATEUR ÉLECTRONIQUE SR7-25  
ELEKTRONISCHER REGLER SR7-25  
REGULADOR ELETRÓNICO SR7-25

Collegamento serie stella / Series star connection / Connection serie étoile / Stern-Reihen-Schaltung / Connexion en serie estrella



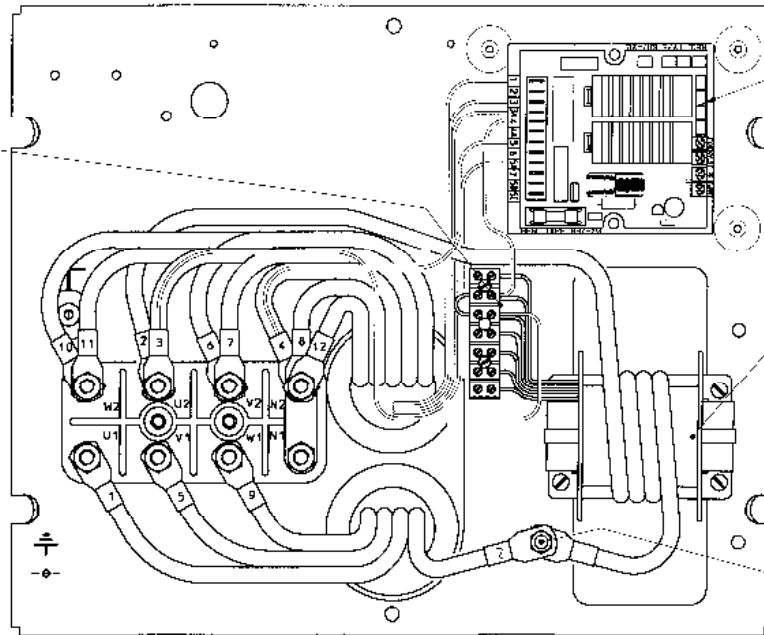
Tavola  
Table  
Abbildung  
Tabla

# 14

SCATOLA REGOLAZIONE 28-31-32 CON DISPOSITIVO DI PARALLELO  
 TERMINAL BOX 28-31-32 WITH PARALLEL DEVICE  
 BOITIER DE REGULATION 28-31-32 AVEC DISPOSITIF DE PARALLELE  
 REGLERKASTEN 28-31-32 MIT EINRICHTUNG FÜR PARALLELBETRIEB  
 CAJA DE REGULACION 28-31-32 CON DISPOSITIVO DE PARALELO



REMOVETE EL FONDELLO  
 PER ABILITARE IL  
 DISPOSITIVO DI PARALLELO  
 REMOVE THE LENS BRIDGE TO  
 OPERATE THE PARALLEL DEVICE  
 ENLEVEZ LE COUVERCLE POUR  
 LE FONCTIONNEMENT DU  
 DISPOSITIF DE PARALLELE  
 DEMONTAR EL FUNDILLO  
 PARA ABILITAR EL DISPOSITIVO  
 DE PARALELO

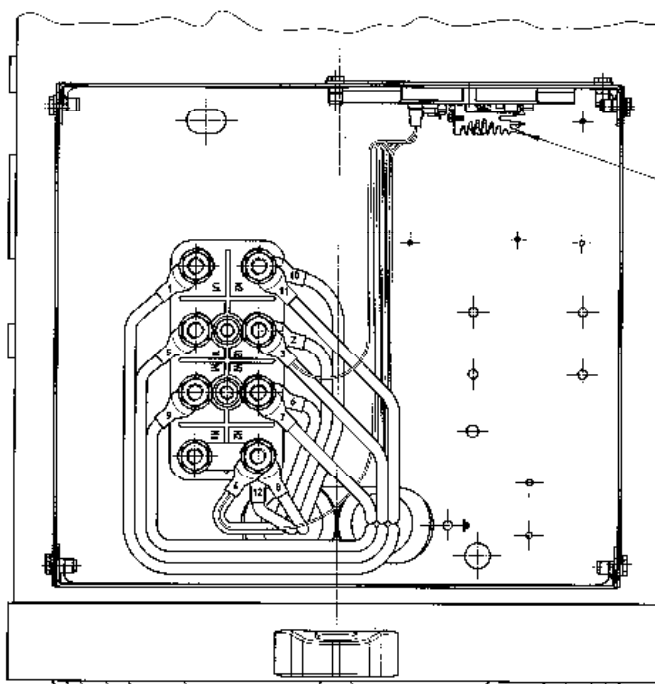


Collegamento serie stella / Series star connection / Connection serie etoile / Stern-Reihen-Schaltung / Connexion en serie estrella

Tavola  
Table  
Abbildung  
Tabla

# 15

SCATOLA REGOLAZIONE 34  
 TERMINAL BOX 34  
 BOITIER DE REGULATION 34  
 REGLERKASTEN 34  
 CAJA DE REGULACION 34



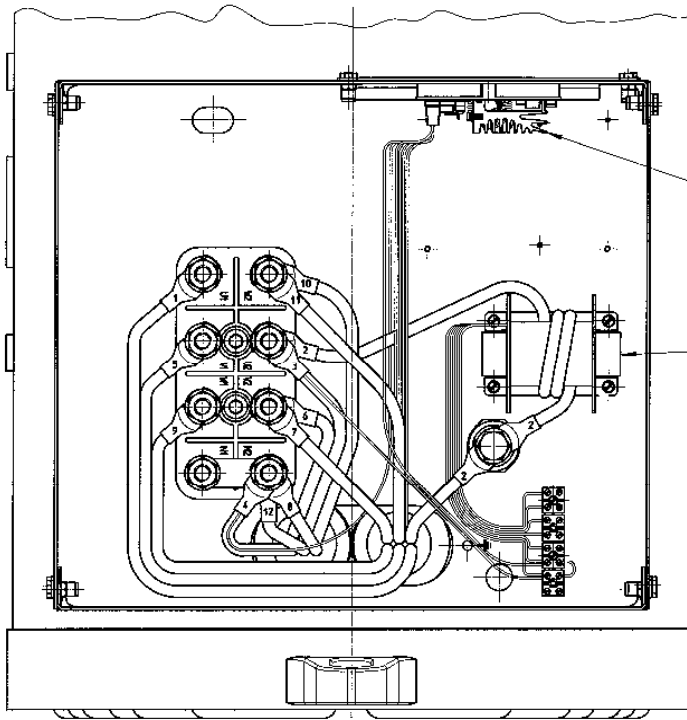
REGOLATORE ELETTRONICO SR7-26  
 ELECTRONIC REGULATOR SR7-26  
 REGULATEUR ELECTRONIQUE SR7-26  
 ELEKTRONISCHE REGLER SR7-26  
 REGULADOR ELECTRONICO SR7-26

Collegamento serie stella / Series star connection / Connection serie etoile / Stern-Reihen-Schaltung / Connexion en serie estrella

Tavola  
Table  
Abbildung  
Tabla

# 16

SCATOLA REGOLAZIONE 34 CON DISPOSITIVO DI PARALLELO  
 TERMINAL BOX 34 WITH PARALLEL DEVICE  
 BOITIER DE REGULATION 34 AVEC DISPOSITIF DE PARALLELE  
 REGLERKASTEN 34 MIT EINRICHTUNG FUR PARALLEL BETRIEB  
 CAJA DE REGULACION 34 CON DISPOSITIVO DE PARALELO



REGOLATORE ELETTRONICO SR7-2G  
 ELECTRONIC REGULATOR SR7-2G  
 REGULATEUR ELECTRONIQUE SR7-2G  
 ELEKTRONISCHE REGLER SR7-2G  
 REGULADOR ELECTRONICO SR7-2G

DISPOSITIVO DI PARALLELO  
 PARALLEL DEVICE  
 DISPOSITIF DE PARALLELE  
 STATIKWANDLER  
 DISPOSITIVO DE PARALELO

Collegamento serie stella / Series star connection / Connection serie etoile / Stern-Reihen-Schaltung / Connexion en serie estrella

Tavola  
Table  
Abbildung  
Tabla

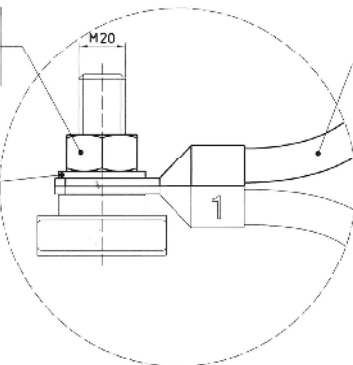
# 17

COLLEGAMENTO CAVI UTILIZZATORE 38-40  
 USER CABLES CONNECTION 38-40  
 CONNEXION DES CÂBLES PAR L'UTILISATEUR 38-40  
 VERBRAUCHERKABELANSCHLUSS 38-40  
 CONEXIÓN CABLES USUARIO 38-40



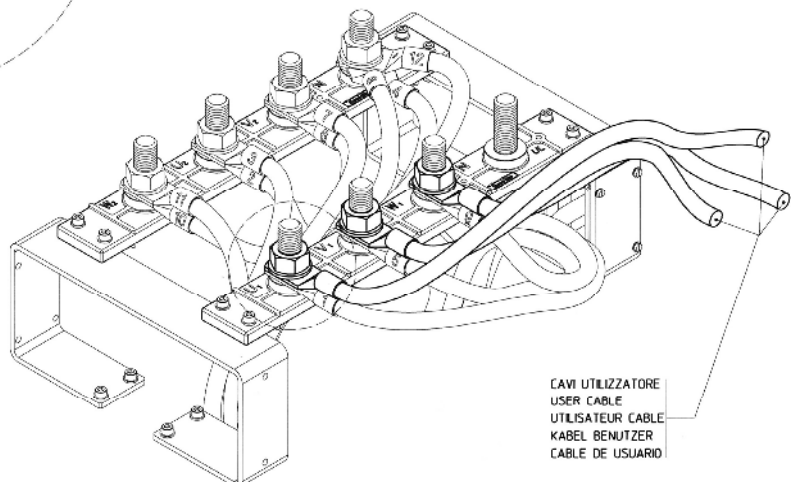
DADO ESAGONALE  
 HEXAGON NUT  
 ECROU HEXAGONAL  
 NUSS HEXAGONAL  
 TUERCA HEXAGONAL

RONDELLA PIANA  
 PLAIN WASHER  
 RONDELLE  
 UNTERLEGSCHIBE  
 ARANDELA SENCILLA



CAVO UTILIZZATORE  
 USER CABLE  
 UTILISATEUR CABLE  
 KABEL BENUTZER  
 CABLE DE USUARIO

COLLEGAMENTO SERIE STELLA  
 SERIES STAR CONNECTION  
 CONNEXION SERIE ETOILE  
 STERN-REIHEN-SCHALTUNG  
 CONNEXION EN SERIE ESTRELLA

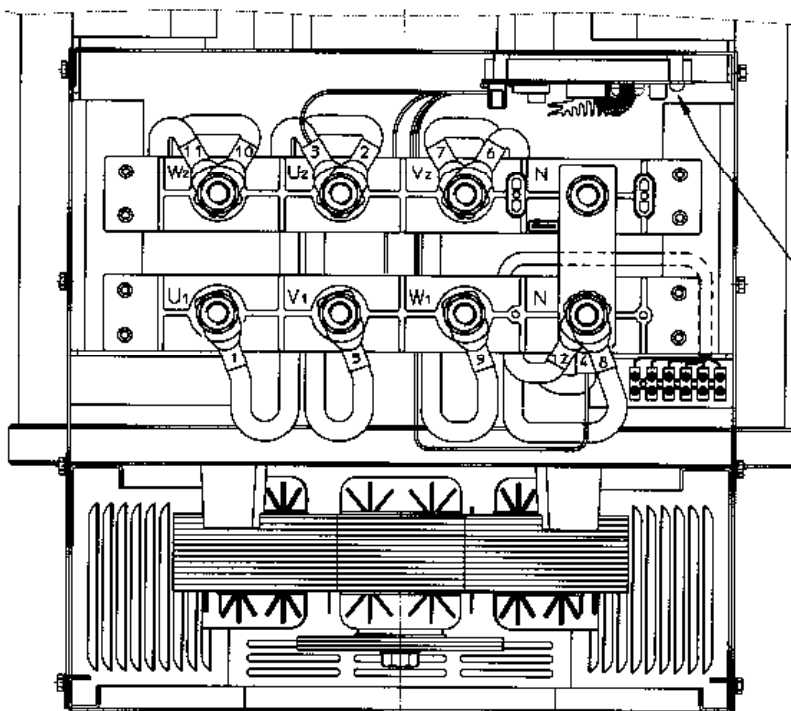


CAVI UTILIZZATORE  
 USER CABLE  
 UTILISATEUR CABLE  
 KABEL BENUTZER  
 CABLE DE USUARIO

Tavola  
Table  
Abbildung  
Tabla

# 18

SCATOLA REGOLAZIONE 38  
TERMINAL BOX 38  
BOITIER DE REGULATION 38  
REGLERKASTEN 38  
CAJA DE REGULACION 38



REGOLATORE ELETTRONICO U.V.R.6/1-F  
ELECTRONIC REGULATOR U.V.R.6/1-F  
REGULATEUR ELECTRONIQUE U.V.R.6/1-F  
ELEKTRONISCHER REGLER U.V.R.6/1-F  
REGULADOR ELECTRONICO U.V.R.6/1-F

Collegamento serie stella / Series star connection / Connection serie etoile / Stern-Reihen-Schaltung / Connexion en serie estrella

Tavola  
Table  
Abbildung  
Tabla

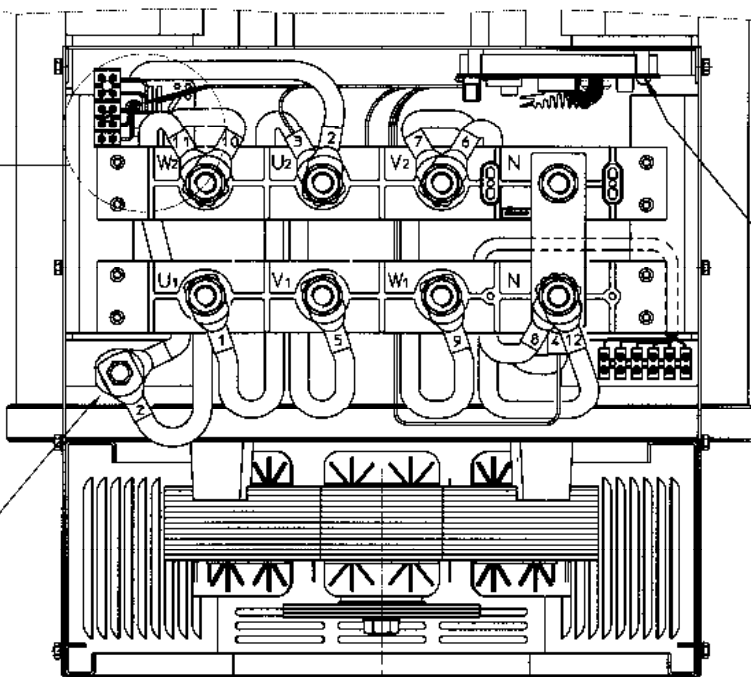
# 19

SCATOLA REGOLAZIONE 38 CON DISPOSITIVO DI PARALLELO  
TERMINAL BOX 38 WITH PARALLEL DEVICE  
BOITIER DE REGULATION 38 AVEC DISPOSITIF DE PARALLELE  
REGLERKASTEN 38 MIT EINRICHTUNG FUR PARALLEL BETRIEB  
CAJA DE REGULACION 38 CON DISPOSITIVO DE PARALELO



DISPOSITIVO DI  
PARALLELO  
PARALLEL DEVICE  
DISPOSITIF DE  
PARALLELE  
STATIKWANDLER  
DISPOSITIVO DE  
PARALELO

ISOLATORE  
INSULATOR  
ISOLATEUR  
ISOLATOR  
AISLADOR



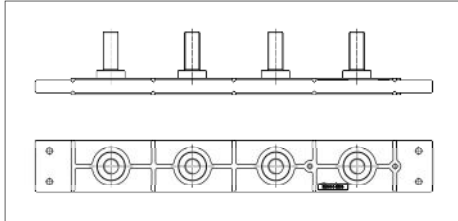
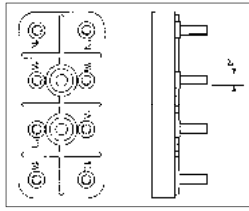
REGOLATORE ELETTRONICO U.V.R.6/1-F  
ELECTRONIC REGULATOR U.V.R.6/1-F  
REGULATEUR ELECTRONIQUE U.V.R.6/1-F  
ELEKTRONISCHER REGLER U.V.R.6/1-F  
REGULADOR ELECTRONICO U.V.R.6/1-F

Collegamento serie stella / Series star connection / Connection serie etoile / Stern-Reihen-Schaltung / Connexion en serie estrella

Tavola  
Table  
Abbildung  
Tabla

# 24

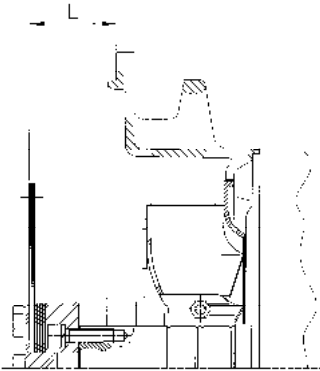
TABELLA COPPIE DI SERRAGGIO PER MORSETTIERE  
TERMINAL BOARD TIGHTENING TORQUE TABLE  
TABLEAU DE COUPLE DE SERRAGE POUR PLANCHETTE A BORNES  
KLEMMENBRETT AUZUGSMOMENT TABELLE  
TABLA PAR DE TORQUE POR PLACA DE BORNES



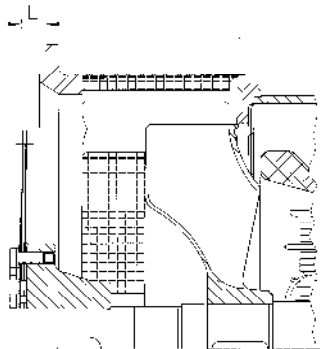
DIAMETRO DI FILETTATURA Df THREAD DIAMETER Df DIAMETRE DE FILETAGE Df GEWINDE DURCHMESSER Df DIAMETRO DE FILETEADO Df	TIPO TYPE TYP	COPPIA DI SERRAGGIO (Nm) TIGHTENING TORQUE (Nm) COUPLE DE SERRAGE (Nm) ANZUGSMOMENT (Nm) PAR DE TORQUE (Nm)
M6	ECP 28	8 ± 7%
M8	ECO 32	18 ± 7%
M10 (Steel)	ECO43-ECO46	30 ± 7%
M12	ECP34	42 ± 7%
M14	ECO32-34 special	54 ± 7%
M16	ECO38	80 ± 7%
M20	ECO40	100 ± 7%

TABELLA COPPIE DI SERRAGGIO PER DISCHI  
COUPLING DISCS TIGHTENING TORQUE TABLE  
TABLEAU DE COUPLE DE SERRAGE POUR DISQUES  
KUPPLUNG AUZUGSMOMENT TABELLE  
TABLA PAR DE TORQUE POR DISCOS

TIPO / TYPE / TYP 28 - 31 - 32

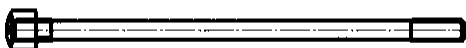


TIPO / TYPE / TYP 34 - 38 - 40  
- 43 - 46



TIPO TYPE TYP	SAE	L	DIMENSIONE VITI SCREWS DIMENSIONS DIMENSIOIS VIS SCHRAUBENBMESSUNGEN DIMENSIONES TORNILLOS		COPPIA DI SERRAGGIO (Nm) TIGHTENING TORQUE (Nm) COUPLE DE SERRAGE (Nm) ANZUGSMOMENT (Nm) PAR DE TORQUE (Nm)	
			TE	TCCEI	CL. 8.8	CL. 12.9
ECP28	6 ½	30,2	M10x30-8.8	/	48	/
	7 ½	30,2	M10x30-8.8	/	48	/
	8	62	M12x30-8.8	M10x30-8.8	80-48	/
	10	53,8	M12x30-8.8	M10x30-8.8	80-48	/
	11 ½	39,6	M10x40-8.8	/	48	/
ECO31-32	6 ½	30,2	/	M12x40-12.9	/	140
	7 ½	30,2	/	M12x40-12.9	/	140
	8	62	M12x30-8.8	M12x40-12.9	80	140
	10	53,8	M12x30-8.8	M12x40-12.9	80	140
	11 ½	39,6	/	M12x40-12.9	/	140
ECP34	10	53,8	M10x30-8.8	M10x40-8.8	48	/
	11 ½	39,6	M10x45-8.8	/	48	/
	14	25,4	M10x30-8.8	/	48	/
ECO38-N	11 ½	39,6	M12x45-8.8	/	80	/
	14	25,4	M12x30-8.8	/	80	/
ECO40	14	25,4	M16x45-8.8	/	200	/
	18	15,7	M16x40-8.8	/	200	/
ECO43-N	14	25,4	M16x55-8.8	/	200	/
	18	15,7	M16x40-8.8	/	200	/
	21	0	M16x40-8.8	/	200	/
ECO46	18	15,7	M16x40-8.8	/	200	/
	21	0	M16x40-8.8	/	200	/

TABELLA COPPIE DI SERRAGGIO PER TIRANTI  
STAY BOLT TIGHTENING TORQUE TABLE  
TABLEAU DE COUPLE DE SERRAGE POUR TIGE  
TABELLE FUR DAS ANZUGSMOMENT VON ZUGSTANGEN  
TABLA PAR DE TORQUE POR TIRANTE



DIAMETRO DI FILETTATURA Df THREAD DIAMETER Df DIAMETRE DE FILETAGE Df GEWINDE DURCHMESSER Df DIAMETRO DE FILETEADO Df	TIPO TYPE TYP	COPPIA DI SERRAGGIO (Nm) TIGHTENING TORQUE (Nm) COUPLE DE SERRAGE (Nm) ANZUGSMOMENT (Nm) PAR DE TORQUE (Nm)
M8	ECP 28	17 ± 7%
M10	ECO 32	48 ± 7%
M14	ECP34	120 ± 7%
M12	ECO38	80 ± 7%
M16	ECO40	180 ± 7%
M14	ECO43-46	120 ± 7%

**GENERATORI A 4 POLI - 4 POLE GENERATORS  
ALTERNATEURS 4 POLES  
GENERATOREN 4 POLIG - GENERADORES 4 POLOS**

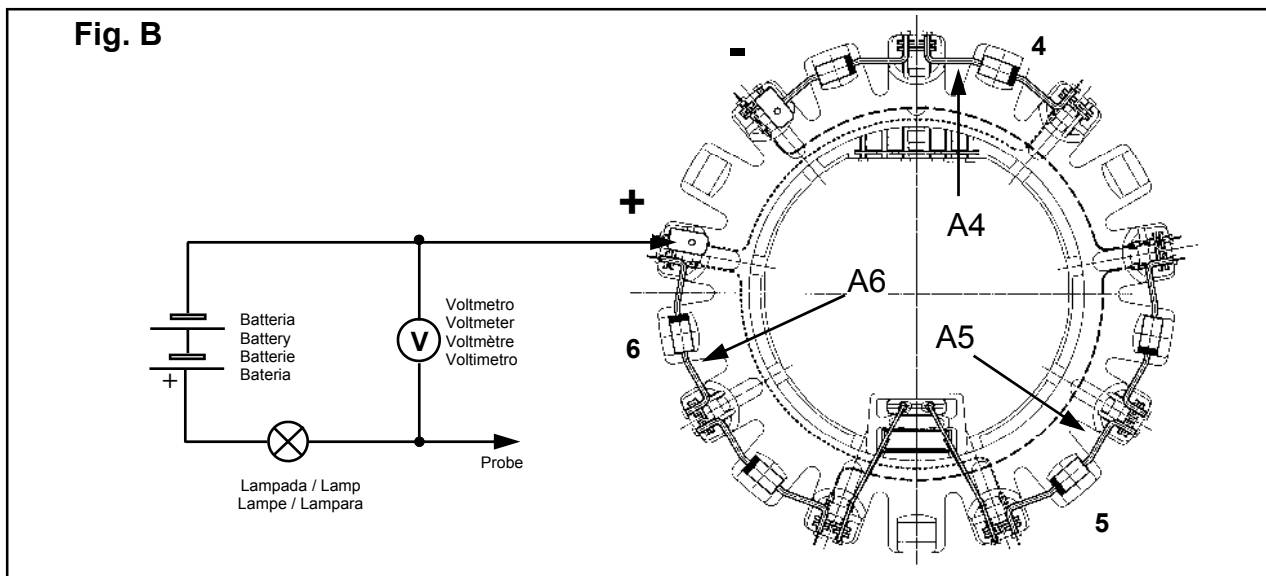
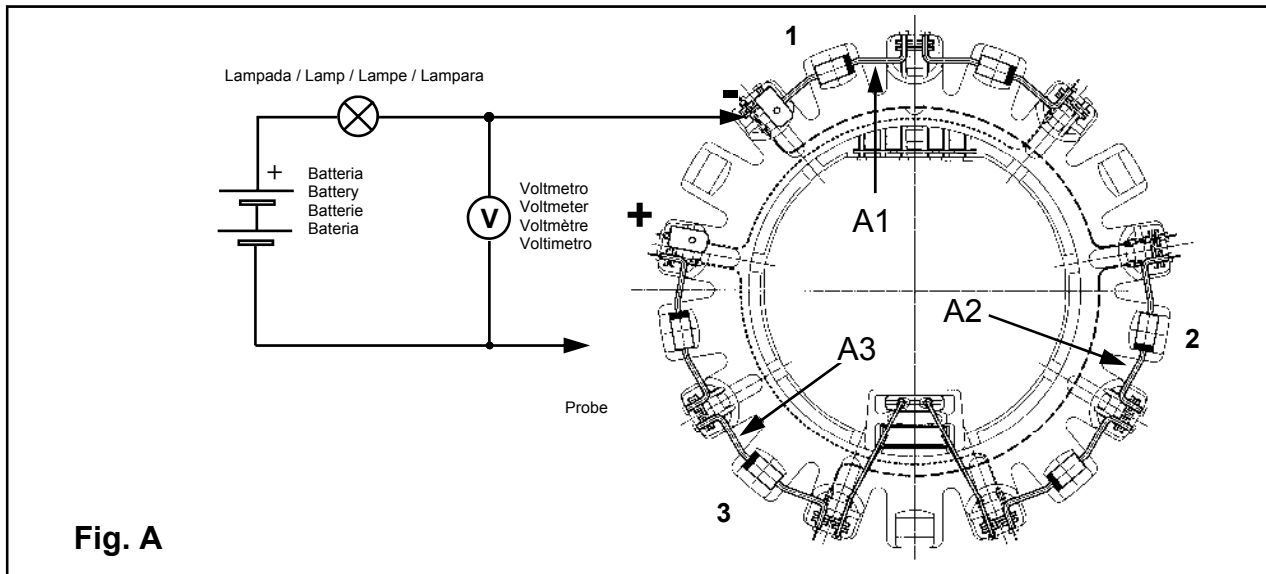
TIPO TYPE TYP	Volume d'aria Air flow Volume d'air Luftmenge Volumen de aire		Rumore Noise Bruit Gerausoh Ruido dB(A)				Peso Weight Poids Gewicht Peso
	m <sup>3</sup> /min		50 Hz		60 Hz		
	50 Hz	60 Hz	1m	7m	1m	7m	
ECP 28 1VS	5,3	5,8	68	57	71	61	82
ECP 28 2VS							89
ECP 28 OS							99
ECP 28 S							107
ECP 28 1L							122
ECP 28 2L							139
ECP 28VL	165						
ECO 32 2S	11,8	14,5	75	60	79	64	199
ECO 32 3S							214
ECO 32 1L							248
ECO 32 2L							282
ECO 32 3L							298
ECP 34 1.5VS	19,3	23	79	65	83	69	310
ECP 34 1S							341
ECP 34 2S							419
ECP 34 1L							445
ECP 34 2L							491
ECP 34 3L							495
ECO 38 1SN	32	39	82	69	86	73	510
ECO 38 2SN							560
ECO 38 3SN							590
ECO 38 1LN							680
ECO 38 2LN							765
ECO 38 3LN							905
ECO 40 1S	54	64,8	94	82	98	88	1040
ECO 40 2S							1118
ECO 40 3S							1171
ECO 40 1L							1324
ECO 40 1.5L							1380
ECO 40 2L							1586
ECO 40 VL	1693						
ECO 43 1SN	90	108	95	84	99	89	1870
ECO 43 2SN							2090
ECO 43 1LN							2395
ECO 43 2LN							2660
ECO 43 VL							2950
ECO 46 1S	135	162	97	86	100	91	2770
ECO 46 1.5S							3380
ECO 46 2S							3440
ECO 46 1L							3720
ECO 46 1.5L							4260
ECO 46 2L							4250

**GENERATORI A 2 POLI - 2 POLE GENERATORS  
ALTERNATEURS 2 POLES  
GENERATOREN 2 POLIG - GENERADORES 2 POLOS**

TIPO TYPE TYP	Volume d'aria Air flow Volume d'air Luftmenge Volumen de aire		Rumore Noise Bruit Gerausoh Ruido dB(A)				Peso Weight Poids Gewicht Peso
	m <sup>3</sup> /min		50 Hz		60 Hz		
	50 Hz	60 Hz	1m	7m	1m	7m	
ECP 28 1L	9,7	11	86	74	90,5	78	129
ECP 28 2L							136
ECP 28 3L							141
ECP 28 VL							156
ECO 31 2SN	22,4	27	88	77	93	80	178
ECO 31 3SN							204
ECO 31 1LN							217
ECO 31 2LN							236



ALTERNATORE TIPO / ALTERNATOR TYPE / ALTERNATEUR TYPE / GENERATOR TYP / ALTERNADOR TIPO : 28-31-32

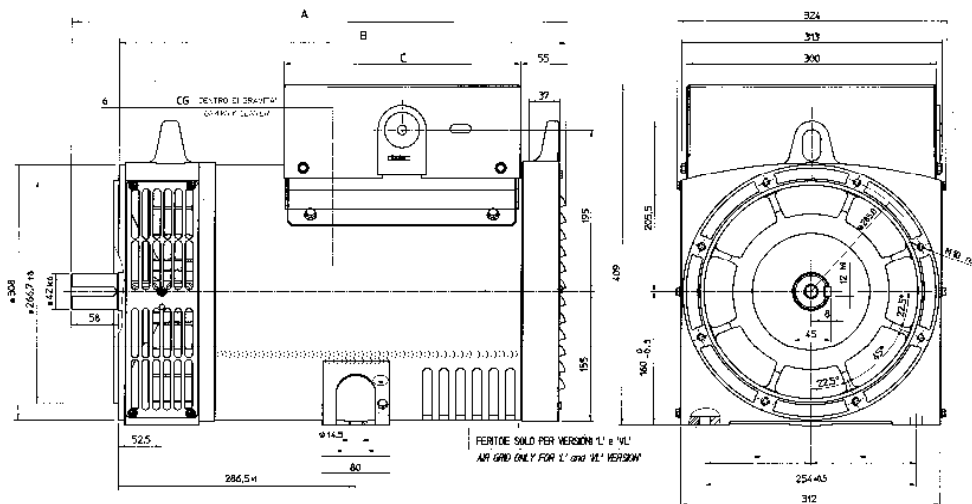


2 and 4 pole  ALTERNATORE TIPO ALTERNATOR TYPE ALTERNATEUR TYPE GENERATOR TYP ALTERNADOR TIPO	TENSIONE MISURATA / VOLTAGE MEASURED TENSION MESUREE / GEMESSENE SPANNUNG TENSION MEDIDA (fig. A-B)		
	Diodo buono Good diode Diode bonne Diode gut Diodo bueno	Diodo in corto Diode in short diode en court-circuit Diode in Kurzschlss Diodo en corto	Diodo aperto Diode open diode ouverte Diode offen Diodo abierto
ECP28, ECO31-2SN, ECO31-3SN, ECO32-2S, ECO32-3S	da 0,8V from 0,8V de von de	a 1,2V to à bis a	inferiore a lower than Inférieure à 0,6V Kleiner als Inferior a
ECO31-1LN, ECO31-2LN, ECO32-1L, ECO32-2L, ECO32-3L	da 0,8V from 0,8V de von de	a 1,2V to à bis a	superiore a more than supérieure à 1,3V grösser als Superior a

# ECP 28

FORMA FORM FORME B3/B14

dimensions in mm



TIPO / TYPE	A	B	C
28 1VS/4-2VS/4	476	418	225
28 0S/4-S/4	516	458	285
28 1L/4-2L/4 28 1L/2-2L/2 28 3L/2	596	538	285
28 VL	626	568	285

TIPO / TYPE	CG*	TIPO / TYPE	CG*
28-1VS/4	230	28-1L/2	267
28-2VS/4	230	28-2L/2	271
28-0S/4	235	28-3L/2	275
28-S/4	237	28-VL/2	291

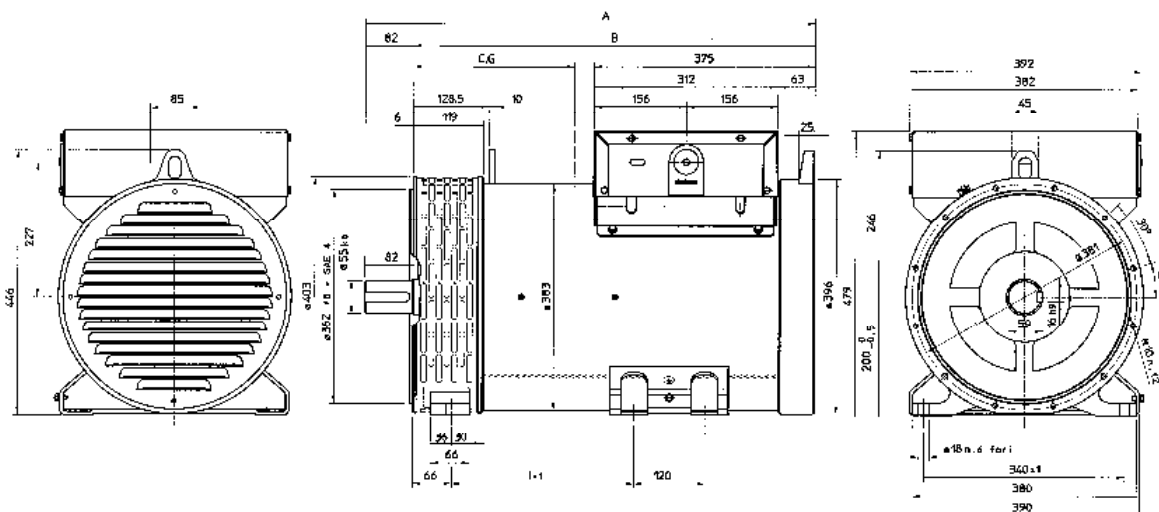
28-1L/4	268
28-2L/4	275
28-VL/4	286

\* Center of Gravity

# ECO 31N

FORMA FORM FORME B3/B14

dimensions in mm



TIPO / TYPE	CG*
31-2S/2	272
31-3S/2	285
31-1L/2	311
31-2L/2	336

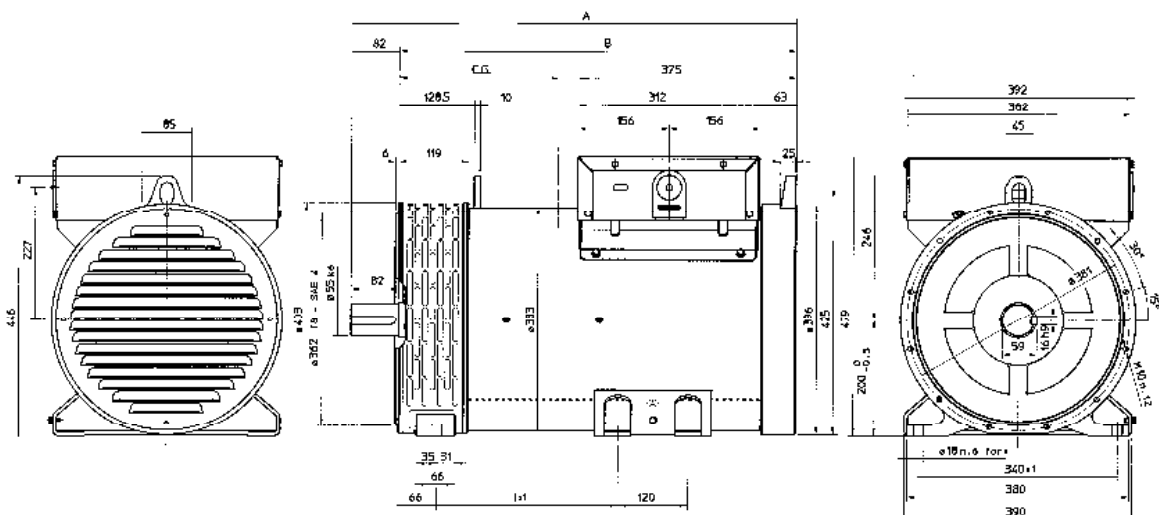
\* Center of Gravity

TIPO / TYPE	A	B	I
ECO 31 S	658	576	205
ECO31 L	763	681	310

# ECO 32

FORMA FORM FORME B3/B14

dimensions in mm



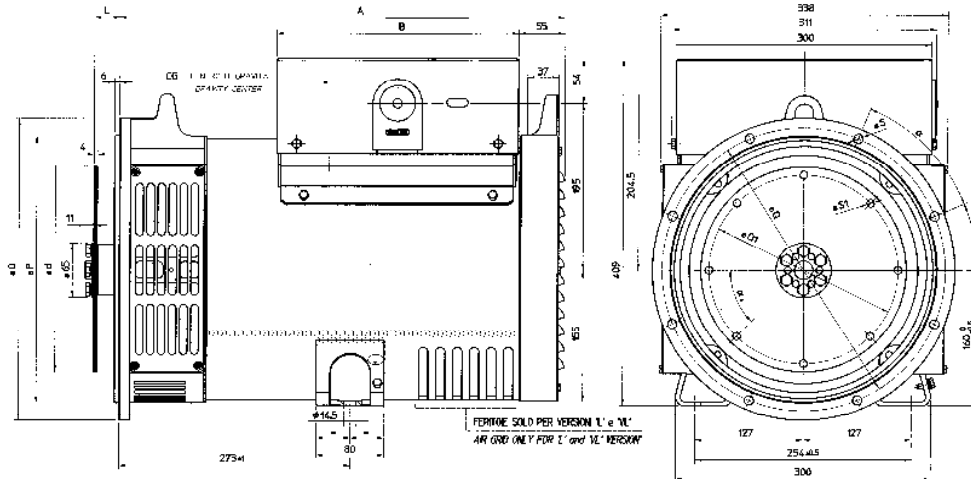
TIPO / TYPE	CG*
32-2S/4	269
32-3S/4	274
32-1L/4	316
32-2L/4	330
32-3L/4	351

\* Center of Gravity

TIPO / TYPE	A	B	I
ECO 32 S	638	556	185
ECO32 L	763	681	310

# ECP 28

FORMA FORM FORME MD35



dimensions in mm

SAE N°	Giunti a dischi Disc coupling Disque de monopulier Scheibenkupplung					
	L	d	Q1	N° fori	S1	α1
6 ½	30,2	215,9	200	6	9	60°
7 ½	30,2	241,3	222,25	8	9	45°
8	62	263,52	244,47	6	11	60°
10	53,8	314,32	295,27	8	11	45°
11 ½	39,6	352,42	333,37	8	11	45°

SAE N°	Flangia / Flange					
	O	P	Q	N° fori	S	α
5	356	314,3	333,4	8	11	45°
4	403	362	381	12	11	30°
3	451	409,6	428,6	12	11	30°
2	490	447,7	466,7	12	11	30°

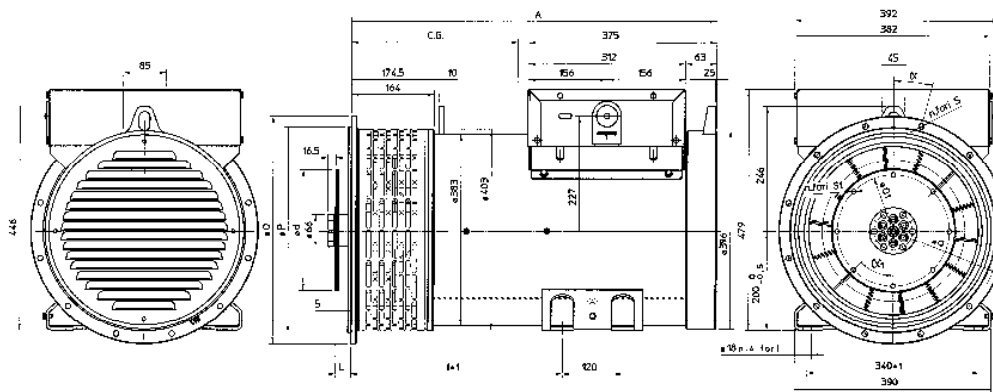
TIPO TYPE	CG*	TIPO TYPE	CG*
28-1L/2	242	28-1VS	200
28-2L/2	248	28-2VS	200
28-3L/2	254	28-0S	214
28-VL/2	273	28-S/4	217

TIPO TYPE	A	B
28 1VS-2VS	405	225
28 0S-S	445	285
28 1L/2-2L/2-3L/2	525	285
28 1L/4-2L/4	525	285
28 VL	555	285

\* Center of Gravity

# ECO 31N

FORMA FORM FORME MD35



dimensions in mm

SAE N°	Giunti a dischi Disc coupling Disque de monopulier Scheibenkupplung					
	L	d	Q1	N° fori	S1	α1
6 ½	30,2	215,9	200	6	9	60°
7 ½	30,2	241,3	222,25	8	9	45°
8	62	263,52	244,47	6	11	60°
10	53,8	314,32	295,27	8	11	45°
11 ½	39,6	352,42	333,37	8	11	45°

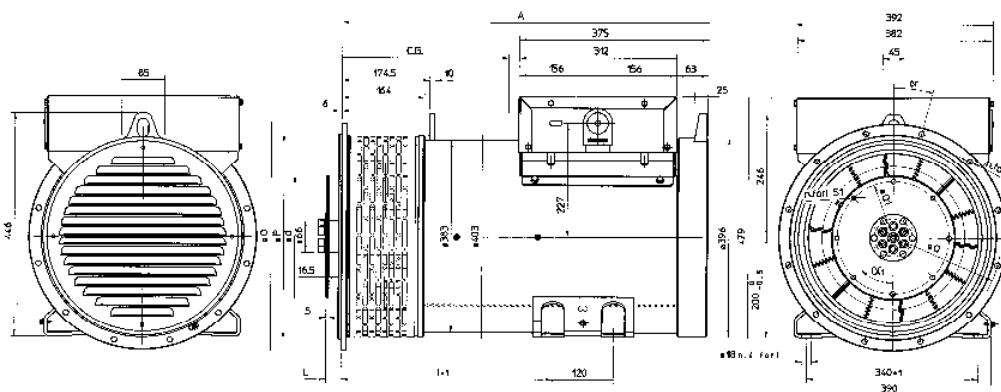
SAE N°	Flangia / Flange Bride / Flansch					
	O	P	Q	N° fori	S	α
5	356	314,3	333,4	8	11	45°
4	403	362	381	12	11	30°
3	451	409,6	428,6	12	11	30°
2	490	447,7	466,7	12	11	30°
1	552	511,2	530,2	12	11	30°

TIPO TYPE	A	B	TIPO TYPE	CG*
ECO 31 S	621	315	31-2SN/2	296
ECO 31 L	726	420	31-3SN/2	310
			31-1LN/2	335
			31-2LN/2	360

\* Center of Gravity

# ECO 32

FORMA FORM FORME MD35



dimensions in mm

SAE N°	Giunti a dischi Disc coupling Disque de monopulier Scheibenkupplung						
	L	d	Q1	N° fori	S1	α1	F
6 ½	30,2	215,9	200	6	9	60°	7
7 ½	30,2	241,3	222,25	8	9	45°	7
8	62	263,52	244,47	6	11	60°	2
10	53,8	314,32	295,27	8	11	45°	10
11 ½	39,6	352,42	333,37	8	11	45°	24

SAE N°	Flangia / Flange Bride / Flansch					
	O	P	Q	N° fori	S	α
5	356	314,3	333,4	8	11	45°
4	403	362	381	12	11	30°
3	451	409,6	428,6	12	11	30°
2	490	447,7	466,7	12	11	30°
1	552	511,2	530,2	12	11	30°

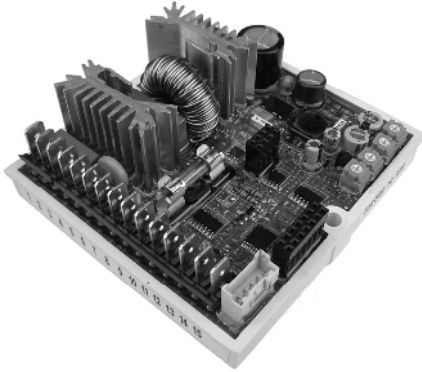
TIPO TYPE	A	I	TIPO TYPE	CG*
ECO 32 S	601	295	32-2S/4	312
ECO 32 L	726	420	32-3S/4	316
			32-1L/4	366
			32-2L/4	377
			32-3L/4	388

\* Center of Gravity



# REGOLATORE DIGITALE DSR

## DSR DIGITAL REGULATOR



Ulteriori informazioni sul regolatore DSR sono scaricabili nell'area download del sito web al seguente indirizzo :

[www.meccalte.com](http://www.meccalte.com)

Further information about DSR regulator are available in the web site download area at following address :

[www.meccalte.com](http://www.meccalte.com)

### INSTALLAZIONE

Al ricevimento del regolatore digitale controllare visivamente che non ci siano danni dovuti al trasporto e alla movimentazione dell'apparato. Nel caso informare immediatamente lo spedizionere, l'assicurazione, il rivenditore o Mecc Alte. Se il regolatore non viene installato immediatamente, immagazzinatelo nel suo imballo originale in un luogo privo di polveri e di umidità.

Il regolatore viene normalmente installato nella scatola morsetti del generatore. Viene fissato con due viti M4x20 o M4x25 e deve essere montato dove la temperatura ambiente non ecceda le condizioni ambientali previste.

### COLLEGAMENTI

I collegamenti al regolatore digitale dipendono dall'applicazione e dal sistema di eccitazione. **Un errore nei collegamenti può avere conseguenze serie per l'unità.** Controllate attentamente e assicuratevi che tutti i collegamenti siano esatti ed in accordo agli schemi allegati, prima di applicare potenza.

### TERMINALI

I collegamenti devono essere eseguiti utilizzando cavi di sezione minima pari a :

- 1,5 mm<sup>2</sup> per i cavi di potenza sui morsetti 1, 2, 3 e 9 (Exc-, Aux/exc+, Aux)
- 1 mm<sup>2</sup> per i cavi di segnale

### INGRESSI E USCITE : SPECIFICHE TECNICHE

### INSTALLATION

Upon receipt of the digital regulator, perform a visual inspection to ensure that no damage has been sustained during transportation and movement of the equipment. In the event of damage, advise the shipper, the insurance company, the seller or Mecc Alte immediately. If the regulator is not installed immediately, store it in its original packaging in a dust and humidity-free environment.

The regulator is normally installed in the generator terminal box. It is fixed with two M4x20 or M4x25 screws and must be installed in a location where the temperature does not exceed the environmental conditions foreseen.

### CONNECTIONS

The digital regulator connections depend on the application and excitation system. **An error in connection may have serious consequences for the unit.** Carefully check to make sure that all connections are precise and in accordance with the attached drawings, before turning on the power.

### TERMINALS

The connections must be made using cables having a minimum diameter:

- 1.5 mm<sup>2</sup> for power cables on terminals 1, 2, 3 and 9 (Exc-, Aux/exc+, Aux)
- 1 mm<sup>2</sup> for signal cables

### INPUTS AND OUTPUTS: TECHNICAL SPECIFICATIONS

TABELLA 1 : CONNETTORE CN1

Morsetto <sup>(1)</sup> Terminal	Denominazione Name	Funzione Function	Specifiche Specifications
1	Exc-	Eccitazione / Excitation	Reg. continuo/Continuous Rating : 4A <sub>dc</sub> max Reg. transitorio/Transitory Rating : 12A <sub>dc</sub> di picco/peak
2	Aux/Exc+		
3	Aux/Exc+	Alimentazione / Power	Frequenza/Frequency : da/from 12Hz a/to 72Hz Range: 40Vac - 270Vac
9	Aux/Neutral		
4	F <sub>phase</sub>	Sensing	Range: 140Vac - 280Vac Assorbimento/Burden : <1VA
5	F <sub>Phase</sub>		
6	H <sub>phase</sub>	Sensing	Range: 70Vac - 140Vac Assorbimento/Burden : <1VA
7	H <sub>phase</sub>		
8	Aux/Neutral		
10	Vext/Pext	Ingresso per controllo remoto della tensione	Tipo/Type: Non isolato/Not isolated Range: 0 - 2,5 V <sub>dc</sub> o Potenziometro/Potentiometer 10K Regolazione/Adjustment: da/from -10% a/to +10% Assorbimento/Burden: 0 - 2 mA (sink) Lunghezza massima/Max length: 30m <sup>(2)</sup>
11	Common	Input for remote voltage control	
12	50/60Hz	Ingresso per jumper 50/60Hz	Tipo/Type: non isolato/not isolated Lunghezza massima/Max length: 3m
13	Common	Jumper Input 50/60Hz	
14	A.P.O.	Uscita protezioni attive	Tipo/Type: Open collector non isolato/not isolated Corrente/Current : 100mA Tensione/Voltage: 30V Lunghezza massima/Max length: 30m <sup>(2)</sup>
15	Common	Active protections output	

**Nota 1)** Sono connessi assieme sulla scheda i morsetti: 2 con 3, 4 con 5, 6 con 7, 8 con 9, 11 con 13 e 15.

**Nota 2)** con filtro EMI esterno (3m senza filtro EMI)

A bordo di alternatori nuovi di fabbrica il DSR è già tarato, in caso di regolatori sciolti (ad es. ricambi) o qualora siano richieste variazioni di cablaggio o di taratura, per garantirne il corretto funzionamento esso dovrà essere accuratamente impostato.

Le impostazioni basilari possono essere effettuate direttamente sul regolatore tramite i 4 trimmers (VOLT - STAB - Hz - AMP), il jumper 50/60 e l'ingresso Vext. Impostazioni o misure più dettagliate possono essere effettuate esclusivamente via software utilizzando ad esempio l'interfaccia di comunicazione MeccAlte DI1 e il programma DSR\_Terminal o DSR\_Reader.

#### Ingresso Vext

L'ingresso Vext (connettore CN1 morsetti 10 e 11) permette il controllo remoto analogico della tensione di uscita tramite un potenziometro da 10Kohm con range di variazione programmabile via software (di default l'impostazione è  $\pm 5\%$ ) rispetto al valore impostato; qualora si volesse impiegare una tensione continua, essa avrà effetto se compresa nel range da 0V a +2,5V. L'ingresso tollera tensioni da -5V a +5V ma per valori che eccedono i limiti 0V / +2,5V (o in caso di sconnessione) esso non viene considerato e la regolazione della tensione ritorna sul valore impostato tramite trimmer.

**NOTA** : La sorgente di tensione continua deve essere in grado di assorbire almeno 2 mA.

#### Segnale 50/60

Un jumper posto sull'ingresso 50/60 (connettore CN1 morsetti 12 e 13) comporta la commutazione della soglia di protezione di bassa velocità da  $50 \cdot (100\% - \alpha \text{Hz}\%)$  a  $60 \cdot (100\% - \alpha \text{Hz}\%)$  dove  $\alpha \text{Hz}\%$  rappresenta la posizione relativa del trimmer Hz.

#### Contatto APO

Acronimo di **Active Protection Output** : (connettore CN1 morsetti 14 e 15) transistor open collector non isolato 30V-100mA, normalmente aperto, si chiude (con un ritardo programmabile via software da 1 a 15 secondi) quando, tra tutti gli allarmi, ne risultano attivi uno o più selezionabili via software separatamente.

Il trimmer **VOLT** permette una regolazione da circa 70V a circa 140V qualora per il sensing si utilizzino i morsetti 4 e 5, oppure da circa 140V a circa 280V qualora si utilizzino i morsetti 6 e 7.

Il trimmer **STAB** regola la risposta dinamica (statismo) dell'alternatore in condizioni transitorie.

Il trimmer **AMP** regola la soglia di intervento della protezione di sovraccorrente di eccitazione.

Per tarare la protezione di sovraccarico seguire la seguente procedura:

- 1) ruotare il trimmer Hz tutto in senso antiorario
- 2) applicare all'alternatore il carico nominale
- 3) diminuire la velocità del 10%
- 4) ruotare il trimmer AMP completamente in senso antiorario
- 5) dopo alcuni secondi, si dovrà notare una diminuzione nel valore della tensione del generatore, e l'attivazione dell'allarme 5 (visibile tramite un cambio del lampeggio del LED)
- 6) In queste condizioni, ruotare lentamente il trimmer "AMP" in senso orario fino a portare il valore della tensione di uscita al 97% del valore nominale: l'allarme 5 è ancora attivo.
- 7) Riportandosi alla velocità nominale, dopo alcuni secondi l'allarme 5 scompare e la tensione del generatore sale al valore nominale.
- 8) ritarare il trimmer Hz come indicato al seguente paragrafo.

Il trimmer **Hz** permette la taratura della soglia d'intervento della protezione di bassa velocità fino al -20% rispetto al valore di velocità nominale impostato dal jumper 50/60 (a 50 Hz la soglia può essere tarata da 40Hz a 50Hz, a 60 Hz la soglia può essere tarata da 48Hz a 60Hz).

L'intervento della protezione fa diminuire la tensione del generatore e la taratura si effettua come segue :

- 1) ruotare il trimmer Hz tutto in senso antiorario
- 2) se la macchina deve funzionare a 60 Hz, assicurarsi che sia inserito il ponticello tra i morsetti 12 e 13 del connettore CN1
- 3) portare il generatore ad una velocità pari al 90% di quella nominale
- 4) agire lentamente sul trimmer "Hz" ruotandolo in senso orario affinché la tensione del generatore inizi a diminuire e simultaneamente accertarsi che il LED inizi a lampeggiare velocemente
- 5) aumentando la velocità, la tensione del generatore si dovrà normalizzare e l'allarme dovrà scomparire
- 6) riportare la velocità al valore nominale.

Durante funzionamento normale un LED montato sulla scheda lampeggia con periodo pari a 2sec e duty cycle del 50%; in caso di intervento o segnalazione di allarme si hanno diverse modalità di lampeggio come indicato in figura 1.

**NOTA:** Pur continuando a regolare la tensione, il DSR si pone in modalità di spegnimento qualora la frequenza scenda sotto i 20Hz. Per il ripristino è necessario fermare completamente l'alternatore.

DSR regulator, on board of new generators, is already calibrated; in case of loose regulators (ie spare parts) or in case of wiring modifications or adjusting, to guarantee its correct working, it must be accurately set .

Basic settings can be done directly on the regulator by its four trimmers (VOLT - STAB - Hz - AMP), the jumper 50/60 and the Vext input. More detailed settings or measures can be done exclusively by software using for example the MeccAlte communication interface DI1 and the program DSR\_Terminal or DSR\_Reader.

#### Vext Input

The Vext input (connector CN1 – terminals 10 and 11) permits analogical remote control of output voltage through a 10Kohm potentiometer with a programmable by software variation range (by default the setting is  $\pm 5\%$ ) with respect to the value set; if you want to use continuous voltage, it will be effective if it is in the range between 0V and +2,5V. The input tolerates voltages from -5V to +5V, but for values exceeding the limits of 0V / +2,5V (or in the event of disconnection) it is automatically disabled and the voltage adjustment goes back to the value set through the trimmer (if enabled).

**NOTE** : The DC voltage generator must be able to sink at least 2mA.

#### 50/60 Signal

A jumper is located on the 50/60 input (connector CN1, terminals 12 and 13); it provokes the commutation of the underspeed protection threshold from  $50 \cdot (100\% - \alpha \text{Hz}\%)$  to  $60 \cdot (100\% - \alpha \text{Hz}\%)$ , where  $\alpha \text{Hz}\%$  represents the position relative to the Hz trimmer.

#### APO Contact

The acronym **APO** stands for Active Protection Output: (connector CN1 – terminals 14 and 15) 30V-100mA non-insulated open collector transistor, normally opened, is closed (with a delay that can be programmed by software from 1 to 15 seconds) when, among all the alarms, one or more of the active ones can be selected separately by software.

The **VOLT** trimmer allows adjustment from about 70V to about 140V when using for sensing terminals 4 and 5, or from about 140V to about 280V when using terminals 6 and 7.

The **STAB** trimmer adjusts the dynamic response (statism) of the alternator under transient conditions.

The **AMP** trimmer adjusts the excitation overcurrent protection intervention threshold.

Use the following procedure in order to calibrate the overload protection:

- 1) Rotate the Hz trimmer entirely in the counter clockwise direction
- 2) Apply the nominal load to the alternator.
- 3) Decrease the speed by 10%
- 4) Rotate the AMP trimmer completely in the counter clockwise direction.
- 5) After a few seconds, there should be a decrease in the voltage value of the generator and alarm 5 should come on (visible due to a change in the flashing indicator light) .
- 6) Under these conditions, rotate the AMP trimmer slowly in the clockwise direction, until the output voltage value is 97% of the nominal value: alarm 5 is still activated.
- 7) Return to the nominal speed; alarm 5 should disappear in a few seconds and the generator voltage should increase to the nominal value.
- 8) Re-adjust the trimmer as indicated in the following paragraph.

The **Hz trimmer** allows to calibrate the threshold of the intervention of the under frequency protection up to -20% with respect to the nominal speed value set by jumper 50/60 (at 50 Hz the threshold can be calibrated from 40 Hz to 50 Hz, at 60 Hz the threshold can be calibrated from 48 Hz to 60 Hz).

The intervention of this protection reduce the output generator voltage and, to calibrate it, use the following procedure :

- 1) Rotate the Hz trimmer entirely in the counter clockwise direction.
- 2) If the machine has to operate at 60 Hz, ensure that the bridge is inserted between terminals 12 and 13 of the CN1 connector.
- 3) Bring the generator to 90% of the nominal speed.
- 4) Slowly turn the "Hz" trimmer, rotating it clockwise until the generator voltage begins to drop and ascertain that the indicator light simultaneously begins flashing rapidly.
- 5) By increasing speed, the generator voltage will normalise and the alarm will disappear.
- 6) Set the speed to the nominal value

During normal operation and a duty cycle of 50% an indicator light mounted on the board flashes every 2 seconds; it flashes differently in the event of intervention or alarm, as indicated in figure 1.

**NOTE:** Notwithstanding DSR maintains the voltage regulation, it goes in shutdown mode if the frequency decreases under 20Hz. The reset needs the Gen-Set switching off.

N.	Descrizione evento <i>Description of event</i>	Azione <i>Action</i>
1	Checksum EEprom	Ripristino dati default, Blocco Reset default, Blockage
2	Sovratensione / <i>Overvoltage</i>	APO
3	Sottotensione / <i>Under voltage</i>	APO
4	Corto circuito / <i>Short circuit</i>	APO, Massima corrente, Blocco APO, Maximum current, Blockage
5	Sovracorrente di eccitazione <i>Excitation Overcurrent</i>	APO, Riduzione corrente di eccitazione APO, Reduction of excitation current
6	Bassa velocità / <i>Underspeed</i>	APO, Rampa/Ramp V/F
7	Sovravelocità / <i>Overspeed</i>	APO

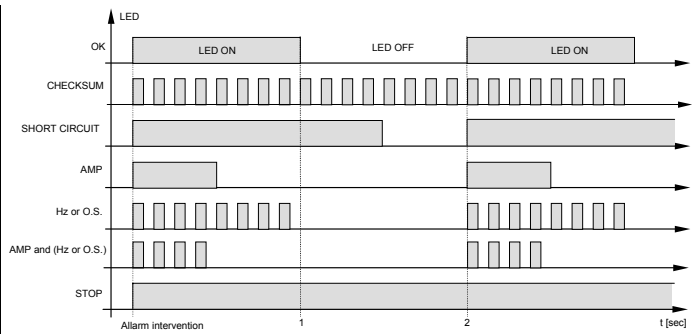
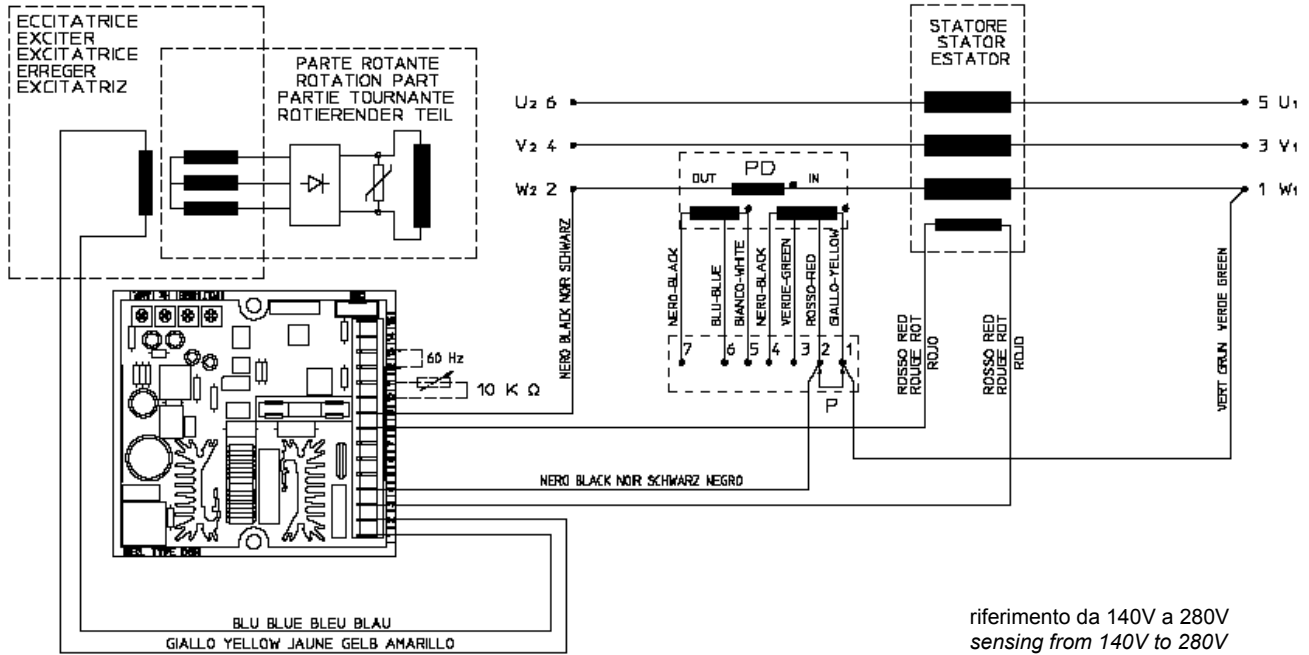


Fig. 1

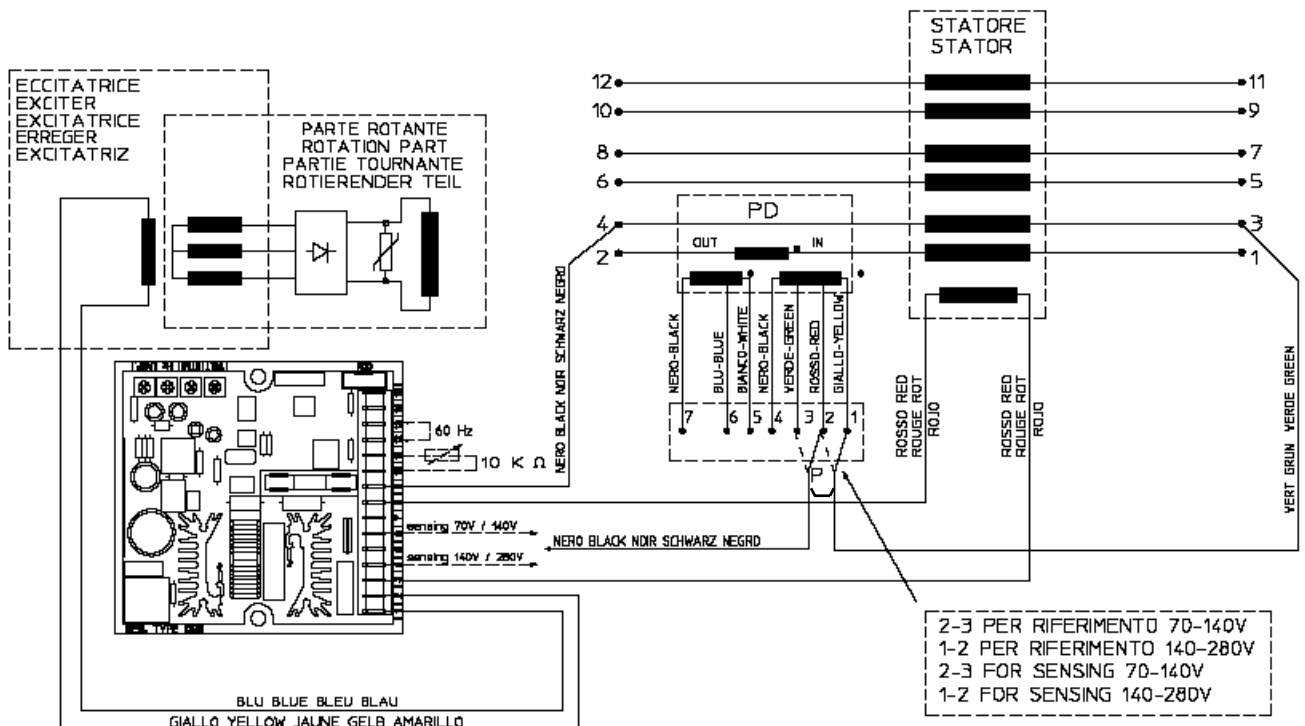
**Alternatori a 6 morsetti / 6 terminal alternators**

SCC0061/02



**Alternatori a 12 morsetti/12 terminal alternators**

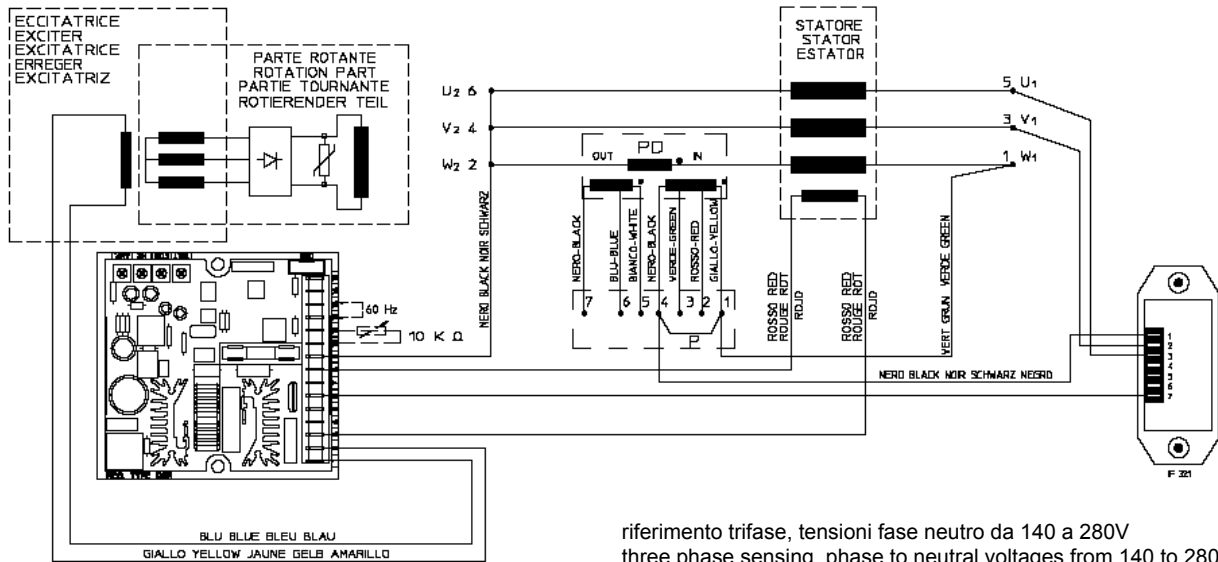
SCC0100/00



morsetto/terminal 4 : sensing 140V / 280V  
morsetto/terminal 6 : sensing 70V / 140V

**Alternatori a 6 morsetti, riferimento trifase/6 terminal alternators, three-phase sensing**

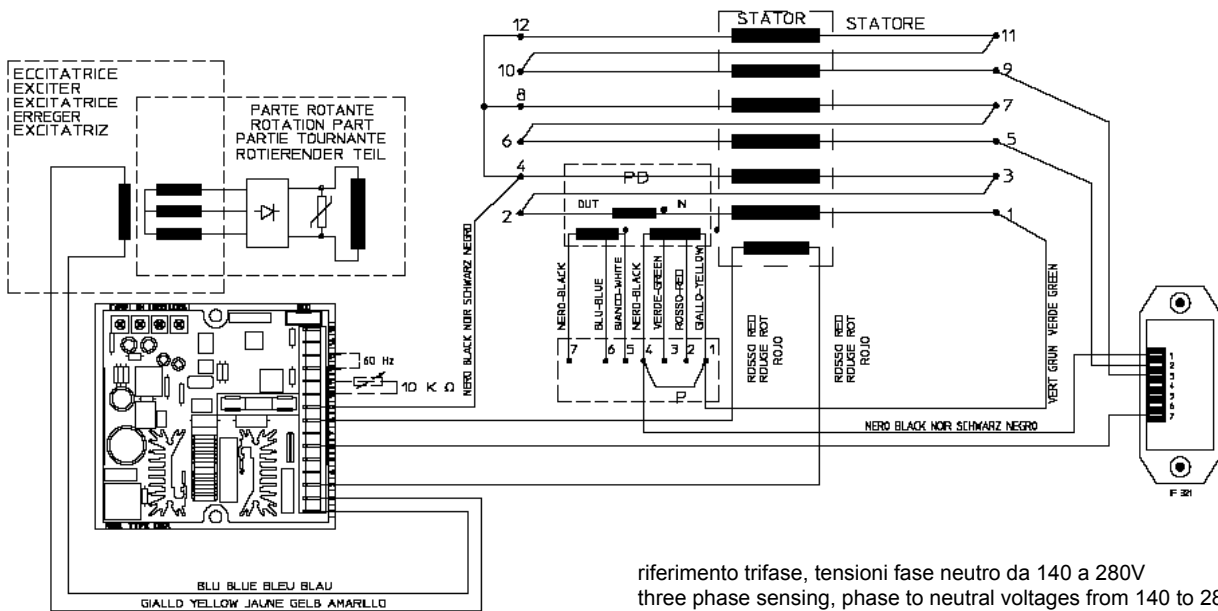
SCC0104/00



riferimento trifase, tensioni fase neutro da 140 a 280V  
three phase sensing, phase to neutral voltages from 140 to 280V

**Alternatori a 12 morsetti, riferimento trifase/12 terminal alternators, three-phase sensing**

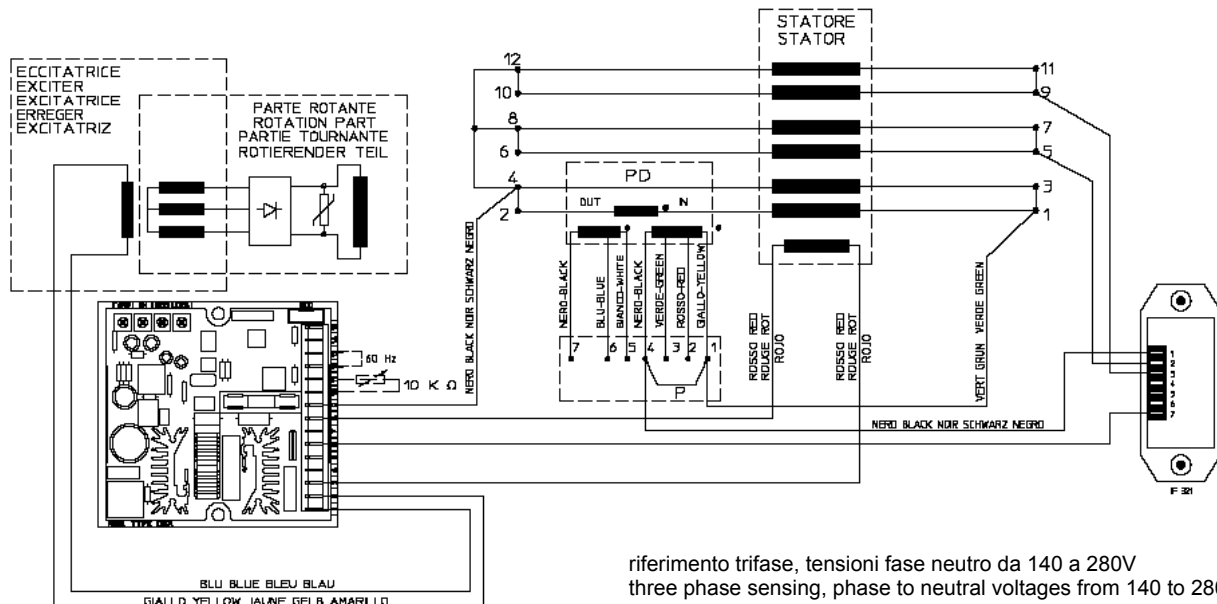
SCC0106/00



riferimento trifase, tensioni fase neutro da 140 a 280V  
three phase sensing, phase to neutral voltages from 140 to 280V

**Alternatori a 12 morsetti, riferimento trifase/12 terminal alternators, three-phase sensing**

SCC0105/00



riferimento trifase, tensioni fase neutro da 140 a 280V  
three phase sensing, phase to neutral voltages from 140 to 280V

## GARANZIA

### A

La Mecc Alte garantisce la buona costruzione e qualita' dei propri alternatori per 24 mesi dalla data di spedizione dai propri stabilimenti o filiali.

### B

Durante il suddetto periodo la Mecc Alte si impegna a riparare o sostituire (a proprie spese) nella propria sede, quelle parti che si fossero avariate, senza pero' essere tenuta a risarcimenti di danni diretti o indiretti.

### C

La decisione sul riconoscimento o meno della garanzia e' riservata esclusivamente alla Mecc Alte previo esame delle parti avariate che dovranno per-venire in porto franco, alla sua sede di Vicenza.

### D

Tutte le eventuali spese di viaggio, trasferta, trasporto, mano d'opera per lo smontaggio e rimontaggio dell'alternatore dall'apparecchiatura azionante sono sempre a carico dell'utente.

### E

La garanzia decade se durante il periodo predetto, i prodotti fossero:

1 immagazzinati in luogo non adatto;

2 riparati o modificati da personale non autorizzato dalla Mecc Alte;

3 usati o sottoposti a manutenzione non in base alle norme stabilite dalla Mecc Alte;

4 sovraccaricati o impiegati in prestazioni diverse da quelle per le quali sono stati forniti.

La garanzia cessa comunque qualora il cliente fosse inadempiente nei pagamenti per qualunque ragione.

## WARRANTY

### A

Mecc Alte warrants the good manufacture and quality of all its products for 24 months, starting from the time of shipment from our factories or our branches.

### B

During said period Mecc Alte obliges to repair or replace at its cost, at its works, all those parts which failed without any other liability of any type, direct or indirect.

### C

The decision for warranty approval is Mecc Alte's exclusive right and subject to a previous examination of the failed parts which are to be forwarded fob Mecc Alte Italy for analysis.

### D

All the eventual expenses concerning travel, board, transport, and labour for assembly/disassembly of alternator from the drive unit are always at the user's charge.

### E

The warranty shall be void if during the above described period the following anomalies should occur:

1 inadequate storage;

2 repair or modification by unauthorized personnel;

3 use or maintenance conditions which do not conform with norms established by Mecc Alte;

4 overload or application other than what the product was meant for.

Warranty coverage also expires whenever the client, for whatever reason, is late in payment.

## GARANTIE

### A

La société Mecc Alte garantit la bonne construction et qualité de ses produits pour une durée de 24 mois à compter de la date d'expédition de ses usines de fabrication ou filiales.

### B

Durant la période indiquée, Mecc Alte s'engage à réparer ou à remplacer (à prix équivalent) dans la société, la partie qui serait endommagée sans toutefois être tenue de prendre en considération les frais directs ou indirects.

### C

La décision sur la prise en charge ou non de la garantie est réservée exclusivement à Mecc Alte sur examen préalable des pièces endommagées qui devront parvenir en port Franco à l'usine de Vicenza.

### D

Tout les éventuels frais de voyage, transfert, transport, main d'oeuvre pour le démontage de l'alternateur sont toujours à la charge de l'utilisateur.

### E

La garantie ne s'applique pas si durant la période indiquée il y a:

1 emmagasinement dans un local non adapté;

2 réparations ou modifications personnelles non autorisées par Mecc Alte;

3 usage et manutentions non conformes aux normes établies par Mecc Alte;

4 surcharges et emplois des fonctions différentes de celles pour lequel ils sont fournis.

Il est bien évident que la garantie ne s'applique que sur le matériel payé en totalité.

## GARANTIE

### A

Die Firma Mecc Alte gibt 24 Monate Garantie ab dem Zeitpunkt der Auslieferung vom Stammhaus oder einer ihrer Filialen auf die einwandfreie Konstruktion und Qualität ihrer Generatoren.

### B

Während der genannten Periode repariert oder ersetzt Mecc Alte zu seinen Kosten alle fehlerhaften Teile, ohne Rücksicht ob direkt oder indirekt.

### C

Mecc Alte behält sich das Recht vor, die fehlerhaften Teile frei Mecc Alte Vicenza zurückzufordern, z u r Schadensuntersuchung

### D

Alle eventuellen Kosten wie Transport, Fahrtkosten, Arbeitslohn für De-und Montage gehen zu Lasten des Kunden.

### E

Die Garantie in O.A. Zeit wird für nachstehende Faktoren ausgeschlossen:

1 nicht korrekte Lagerung;

2 Reparatur oder Modifizierung durch nicht von Mecc Alte autorisiertem Personal;

3 Gebrauch oder Einsatz bei Konditionen die nicht der Norm von Mecc Alte entsprechen;

4 Überlast Gebrauch oder Montage anders als wofür das Produkt bestimmt ist.

Die Garantie erlischt auch, wenn aus welchen Gründen auch immer, der Kunde in Zahlung überfällig ist.

## GARANTIA

### A

Mecc alte garantiza la buena construccion y calidad de los propios productos por 24 meses desde la fecha de salida de sus fabricas o de sus filiales.

### B

Durante dicho periodo la Mecc Alte se obliga a reparar o sustituir a su cargo, en su establecimiento todas aquellas piezas que hubieran sido averiadas, sin hacerse cargo de otro tipo de danos, directos o indirectos.

### C

La decision acerca del reconocimiento de garantia esta reservada exclusivamente a la Mecc Alte, previo examen de las partes averiadas que deberan permanecer en puerto franco o en su propia sede de Vicenza.

### D

Todos los eventuales gastos de transporte, viaje, transferencia o mano de obra, para el desmontaje y nuevo montaje, del alternador o elemento accionante seran siempre a cargo del usuario.

### E

La garantia caduca si durante el periodo descrito se produjeran las siguientes anomalias:

1 almacenaje en lugar inadecuado;

2 reparacion o modificacion por personal no autorizado por Mecc Alte;

3 utilizacion o condiciones de manutencion que contravengan las normas establecidas por Mecc Alte;

4 sobrecarga o empleo en prestaciones distintas de aquellas para las que ha estado suministrado.

La garantia cesa igualmente en el momento que el cliente sea moroso de pago, cualquiera que sea la razon.



I

**ALTERNATORI AUTOREGOLATI SERIE NPE**

ISTRUZIONI PER L'USO E LA MANUTENZIONE

**GB**

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**F**

**ALTERNATEURS AUTO - REGULES SERIE NPE**

MANUEL D'INSTRUCTION ET DE MAINTENANCE

**D**

**SELBSTREGELNDER GENERATOR SERIE NPE**

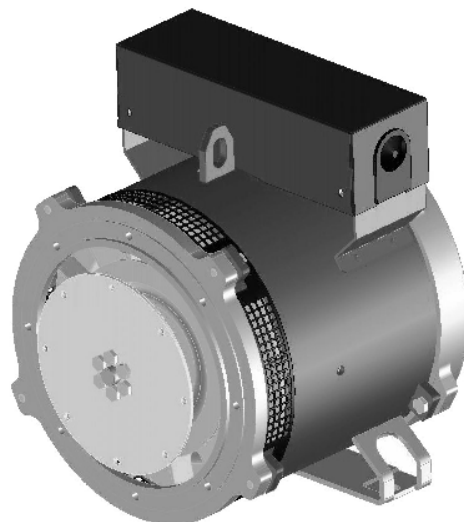
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**E**

**ALTERNADORES AUTOREGULADOS SERIE NPE**

INSTRUCCIONES PARA USO Y MANTENIMIENTO

# NPE



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<b>CENTRI DI ASSISTENZA</b>	<b>57 ÷ 60</b>	<b>AFTER-SALES SERVICE</b>
<b>DESCRIZIONE MACCHINA</b>		<b>MACHINE DESCRIPTION</b>
<p>I generatori della serie NPE sono auto-regolati, brushless a 2 e 4 poli. Hanno induttore rotante provvisto di gabbia di smorzamento e indotto fisso a cave inclinate.</p> <p>Gli avvolgimenti sono a passo raccorciato per ridurre il contenuto armonico.</p> <p>I generatori sono costruiti in conformità alle direttive CEE 2006/42, 2006/95, 2004/108 e relative modifiche, alle norme CEI 2-3, EN60034-1, IEC 34-1, VDE 0530, BS4999-5000.</p> <p>Le prove per la verifica della compatibilità elettromagnetica sono state eseguite nelle condizioni prescritte dalle norme, con il neutro collegato a terra.</p> <p>Esecuzioni in accordo ad altre specifiche possono essere eseguite su richiesta del cliente.</p> <p>La struttura meccanica, sempre molto robusta, consente un facile accesso ai collegamenti e permette di eseguire le verifiche nelle diverse parti altrettanto facilmente. La carcassa e' realizzata in acciaio, gli scudi in alluminio, l'albero in acciaio C45 con ventola calettata.</p> <p>Il grado di protezione e' IP21 (a richiesta e' possibile realizzare un grado di protezione superiore).</p> <p>Gli isolamenti sono eseguiti in classe H, le impregnazioni con resine epossidiche per le parti rotanti e trattamenti sottovuoto per le parti di piu' elevata tensione, quali gli statori (a richiesta trattamenti speciali).</p> <p>Nel campo dei radio disturbi, la produzione di serie soddisfa la norma EN61000-6-3, EN61000-6-1.</p>		<p>NPE 2 and 4 pole alternators are brushless, self-regulating and incorporate a rotating inductor with damper cage winding and a fixed stator with skewed slots. The stator windings have a shortened pitch to reduce the harmonic content of the output waveform.</p> <p>The alternators are made in compliance with the 2006/42, 2006/95, 2004/108 CEE directives and their amendments, and the CEI 2-3, EN60034-1, IEC 34-1, VDE 0530, BS4999-5000 regulations. Tests to verify the electromagnetic compatibility have been carried out in the foreseen conditions by the standards with the neutral connected to the earth.</p> <p>On customer's request alternators can be manufactured according to different specifications.</p> <p>The robust mechanical construction gives good access to the generator output connections, and allows the user to inspect the various components with ease. The casing is made of steel, the shields of aluminium, and the shaft of C45 steel and it has a keyed fan.</p> <p>The mechanical protection level meets standard IP21 (upon request higher levels of protection can be supplied).</p> <p>Insulation materials meet Class H requirements, and all rotating components are epoxy resins impregnated; higher voltage parts, such as the stators, are vacuum-treated (special treatments are available on request).</p> <p>Radio interference suppression meets the requirements of EN61000-6-3, EN61000-6-1 regulations.</p>

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<b>DESCRIPTION DE LA MACHINE</b>	<b>MASCHINENBESCHREIBUNG</b>	<b>DESCRIPCION MAQUINA</b>
<p>Les alternateur de série NPE sont auto-régulés, sans bague ni balai à 2 et 4 pôles. Ils sont à inducteurs tournants avec cage d'amortissement et stators à encoches inclinées. Les bobinages sont à pas raccourcis afin de réduire le taux d'harmoniques. Les alternateurs sont construits en conformité aux directives CEE 2006/42, 2006/95, 2004/108 et leurs modifications, aux normes CEI 2-3, EN 60034-1, IEC 34-1, VDE 0530, BS4999-5000. Les essais pour la vérification de la compatibilité électromagnétique ont été exécutées dans les conditions prescrites par les normes avec le neutre connecté à la masse. Les exécutions en accord avec d'autres spécifications peuvent être suivies sur demande du client. La structure mécanique, toujours très robuste, permet un accès facile aux raccordements et permet les vérifications des autres parties très facilement. La carcasse est en acier, les flasques en aluminium, l'arbre est en acier C45 avec ventilateur claveté. Le grade de protection est IP21 (sur demande, il est possible de réaliser un grade de protection supérieure). Les isollements sont de la classe H, les imprégnations en vernis epoxy pour les parties tournantes et les parties plus élevées en tension comme les stators sont imprégnées sous vide et pression (sur demande, nous pouvons exécuter des traitements spéciaux). Dans le domaine des antiparasitages, la production de série satisfait la norme EN61000-6-3, EN61000-6-1.</p>	<p>Die 2 und 4 poligen Generatoren der Serie NPE sind selbstregelnd und bürstenlos. Sie besitzen einen mit einem Dämpfungskäfig ausgestatteten, rotierenden Anker und einen fest eingebauten Stator mit schrägen Nuten. Die Wicklungen sind im Schritt verkürzt, um den harmonischen Gehalt der Wellenform zu reduzieren. Die Generatoren sind in Übereinstimmung mit den Bestimmungen CEE 2006/42 sowie mit 2006/95 und 2004/108 und deren entsprechenden Änderungen und den Normen CEI 2-3, EN 60034-1, IEC 34-1, VDE 0530, BS4999-5000, hergestellt. Die elektromagnetische Verträglichkeitsprüfungen wurden, wie in den Normen vorgeschriebenen mit geerdetem Stempunkt ausgeführt. Ausführungen, die anderen als den angegebenen Spezifikationen entsprechen sollen, können auf Kundenanfrage hergestellt werden. Die mechanische, sehr widerstandsfähige, robuste Struktur ermöglicht leichten Zugang zu den Verbindungen und Anschlüssen und erlaubt eine ebenso leichte Kontrolle der verschiedenen Teile. Das Gehäuse besteht aus Aluminium, die (Schutz) schilde aus Gußeisen, die Welle aus C45-Stahl mit aufgezogenem Lüfterrad. Die Schutzklasse ist IP21 (auf Anfrage kann auch eine höhere Schutzklasse realisiert werden). Die Isolierungen entsprechen der Klasse H, die Imprägnierungen erfolgen mit Epoxidharzen für die drehbaren Teile, bzw. durch Vakuumverfahren für die Teile, die erhöhter Spannung ausgesetzt sind, wie z.B. Ständer (auf Anfrage auch Sonderverfahren möglich). Bezüglich der Funkstörungen, entspricht die Produktionsserie der EN 61000-6-3, EN 61000-6-1 Normen.</p>	<p>Los generadores serie NPE son auto-regulados, brushless a 2 y 4 polos. Posen inductor rotante con jaula de atenuación e inducido fijo con canaletas inclinadas. Los bobinados son a paso recortado para reducir el contenido armónico. Los generadores están construidos en conformidad a las directivas CEE 2006/42, 2006/95, 2004/108 y sus modificaciones, normas CEI 2-3, EN 60034-1, IEC 34-1, VDE 0530, BS 4999-5000. Las pruebas de conformidad a la compatibilidad electromagnética fueron realizadas en las condiciones indicadas por las normas en decir con el neutro conectado a tierra. Construcciones de acuerdo con otras específicas podrán ser realizadas bajo pedido del cliente. La estructura mecánica, siempre de gran consistencia, permite un fácil acceso a los conexionados, como así también un control de las diferentes partes de la misma. La carcasa está construida en acero, las tapas en aluminio, el eje en acero C45 con ventilador acoplado. El grado de protección es IP21 (a pedido es posible realizar un grado de protección superior). Los aislantes son en clase H, las partes rotantes son impregnadas con resinas epoxídicas con tratamiento en vacío para las partes que trabajan a mayor tensión, como son los estatores (a pedido tratamientos especiales). En el campo de la radio-interferencia, la producción de serie satisface las normas EN61000-6-3, EN61000-6-1.</p>



## PREMESSA

I generatori della serie NPE, rispondono alle direttive CEE 2006/42, 2006/95, 2004/108 e relative modifiche; pertanto non presentano pericolo per l'operatore, se installati, usati, mantenuti secondo le istruzioni fornite dalla Mecc Alte e a condizione che i dispositivi di sicurezza siano tenuti in perfetta efficienza.

Per questa ragione occorre attenersi scrupolosamente alle istruzioni indicate in questo manuale.

E' vietata qualsiasi riproduzione di questo manuale.

## IDENTIFICAZIONE MACCHINA

Per qualsiasi comunicazione con la Mecc Alte o con i centri di assistenza autorizzati, citare sempre il tipo e il codice del generatore.

## VERIFICA ALLA CONSEGNA

Alla consegna del generatore controllare con la bolla di accompagnamento che non ci siano danni o parti mancanti; nel caso informare immediatamente lo spedizioniere, l'assicurazione, il rivenditore o la Mecc Alte.

## PRESCRIZIONI DI SICUREZZA

Prima di qualsiasi intervento di pulizia, lubrificazione o manutenzione assicurarsi che il motore primario a cui e' collegato il generatore non sia in funzione, ma fermo e isolato dalle sue fonti di energia.

Per fermare il generatore occorre seguire scrupolosamente la procedura di arresto del sistema di trascinamento; il generatore non e' previsto di Stop/Emergenza, ma si arresta istantaneamente in relazione al sistema di arresto predisposto dall'installatore.



## INTRODUCTION

The NPE alternators comply with the EEC 2006/42, 2006/95, 2004/108 directives and their amendments; therefore they pose no danger to the operator if they are installed, used and maintained according to the instructions given by Mecc Alte and provided the safety devices are kept in perfect working conditions.

Therefore a strict observance of these instructions is required.

Any reproduction of this manual is forbidden.

## MACHINE IDENTIFICATION

Always indicate the generator type and code when contacting Mecc Alte or the authorized after-sales service centres.

## INSPECTION ON DELIVERY

When the alternator is delivered, check that unit conforms with the delivery note and ensure that there are no damaged or defective parts; should there be any, please inform the forwarding agent, the insurance company, the seller or Mecc Alte immediately.

## SAFETY REQUIREMENTS

Before any cleaning, lubrication or maintenance operation, ensure that the generator is stationary and disconnected from the power supply.

When stopping the generator, ensure the compliance with the procedures for stopping the prime mover.

The generator, in fact, has no Emergency Stop, but is controlled by the device arranged by the installer.

<b>mecc alte spa</b>		Via Roma n.20, 36061 Tel. 0444/396111-R.L.A. Creazzo Vicenza Italia Fax 0444/396188		B S S S		CE	
CREAZZO VICENZA ITALIA	TYPE	V	PHASE				
KVA		COSPHI	TNS. CL.				
R.P.M.							
V							
A							
CONNECTION			IP.				
SERV.	V. COAR.		I. ACC.				
KG	J		OOD				
CENSIMENTO			DATE				MADE IN ITALY
REQUIREMENTS							
PER MECC ALTE PERI S.p.A. 2014 2015 ALTERNATORE AUTOREGOLATO SELF REGULATED ALTERNATOR AUTOREGULABLE EN 60028-1, IEC 60028-1, IEC 60028-2, IEC 60028-3, IEC 60028-4, IEC 60028-5, IEC 60028-6, IEC 60028-7, IEC 60028-8, IEC 60028-9, IEC 60028-10, IEC 60028-11, IEC 60028-12, IEC 60028-13, IEC 60028-14, IEC 60028-15, IEC 60028-16, IEC 60028-17, IEC 60028-18, IEC 60028-19, IEC 60028-20, IEC 60028-21, IEC 60028-22, IEC 60028-23, IEC 60028-24, IEC 60028-25, IEC 60028-26, IEC 60028-27, IEC 60028-28, IEC 60028-29, IEC 60028-30, IEC 60028-31, IEC 60028-32, IEC 60028-33, IEC 60028-34, IEC 60028-35, IEC 60028-36, IEC 60028-37, IEC 60028-38, IEC 60028-39, IEC 60028-40, IEC 60028-41, IEC 60028-42, IEC 60028-43, IEC 60028-44, IEC 60028-45, IEC 60028-46, IEC 60028-47, IEC 60028-48, IEC 60028-49, IEC 60028-50, IEC 60028-51, IEC 60028-52, IEC 60028-53, IEC 60028-54, IEC 60028-55, IEC 60028-56, IEC 60028-57, IEC 60028-58, IEC 60028-59, IEC 60028-60, IEC 60028-61, IEC 60028-62, IEC 60028-63, IEC 60028-64, IEC 60028-65, IEC 60028-66, IEC 60028-67, IEC 60028-68, IEC 60028-69, IEC 60028-70, IEC 60028-71, IEC 60028-72, IEC 60028-73, IEC 60028-74, IEC 60028-75, IEC 60028-76, IEC 60028-77, IEC 60028-78, IEC 60028-79, IEC 60028-80, IEC 60028-81, IEC 60028-82, IEC 60028-83, IEC 60028-84, IEC 60028-85, IEC 60028-86, IEC 60028-87, IEC 60028-88, IEC 60028-89, IEC 60028-90, IEC 60028-91, IEC 60028-92, IEC 60028-93, IEC 60028-94, IEC 60028-95, IEC 60028-96, IEC 60028-97, IEC 60028-98, IEC 60028-99, IEC 60028-100							

<b>mecc alte spa</b>		Via Roma n.20, 36061 Tel. 0444/396111-R.L.A. Creazzo Vicenza Italia Fax 0444/396188		B S S S		CE	
CREAZZO VICENZA ITALIA	TYPE	V	PHASE				
KVA		COSPHI	TNS. CL.				
R.P.M.							
V							
A							
CONNECTION			IP.				
SERV.	V. COAR.		I. ACC.				
KG	J		OOD				
CENSIMENTO			DATE				MADE IN ITALY
REQUIREMENTS							
PER MECC ALTE PERI S.p.A. 2014 2015 ALTERNATORE AUTOREGOLATO SELF REGULATED ALTERNATOR AUTOREGULABLE EN 60028-1, IEC 60028-1, IEC 60028-2, IEC 60028-3, IEC 60028-4, IEC 60028-5, IEC 60028-6, IEC 60028-7, IEC 60028-8, IEC 60028-9, IEC 60028-10, IEC 60028-11, IEC 60028-12, IEC 60028-13, IEC 60028-14, IEC 60028-15, IEC 60028-16, IEC 60028-17, IEC 60028-18, IEC 60028-19, IEC 60028-20, IEC 60028-21, IEC 60028-22, IEC 60028-23, IEC 60028-24, IEC 60028-25, IEC 60028-26, IEC 60028-27, IEC 60028-28, IEC 60028-29, IEC 60028-30, IEC 60028-31, IEC 60028-32, IEC 60028-33, IEC 60028-34, IEC 60028-35, IEC 60028-36, IEC 60028-37, IEC 60028-38, IEC 60028-39, IEC 60028-40, IEC 60028-41, IEC 60028-42, IEC 60028-43, IEC 60028-44, IEC 60028-45, IEC 60028-46, IEC 60028-47, IEC 60028-48, IEC 60028-49, IEC 60028-50, IEC 60028-51, IEC 60028-52, IEC 60028-53, IEC 60028-54, IEC 60028-55, IEC 60028-56, IEC 60028-57, IEC 60028-58, IEC 60028-59, IEC 60028-60, IEC 60028-61, IEC 60028-62, IEC 60028-63, IEC 60028-64, IEC 60028-65, IEC 60028-66, IEC 60028-67, IEC 60028-68, IEC 60028-69, IEC 60028-70, IEC 60028-71, IEC 60028-72, IEC 60028-73, IEC 60028-74, IEC 60028-75, IEC 60028-76, IEC 60028-77, IEC 60028-78, IEC 60028-79, IEC 60028-80, IEC 60028-81, IEC 60028-82, IEC 60028-83, IEC 60028-84, IEC 60028-85, IEC 60028-86, IEC 60028-87, IEC 60028-88, IEC 60028-89, IEC 60028-90, IEC 60028-91, IEC 60028-92, IEC 60028-93, IEC 60028-94, IEC 60028-95, IEC 60028-96, IEC 60028-97, IEC 60028-98, IEC 60028-99, IEC 60028-100							

<b>INTRODUCTION</b>	<b>VORWORT</b>	<b>ACLARACION</b>
<p>Les alternateurs de la série NPE répondent aux directives CEE 2006/42, 2006/95, 2004/108 et leurs modifications. Toutefois, ils ne présentent aucun danger pour l'utilisateur si l'installation, l'utilisation, les manutentions suivent les instructions fournies par Mecc Alte et à condition que les dispositifs de protection soient tenus en parfait état de marche.</p> <p>Pour cette raison, il faut se conformer scrupuleusement aux instructions indiquées dans ce manuel.</p> <p>Il est interdit de reproduire quoique ce soit dans ce manuel.</p>	<p>Die Generatoren entsprechen den EG - Bestimmungen 2006/42, 2006/95, 2004/108 und deren entsprechenden Änderungen; aus diesem Grunde stellen sie keinerlei Gefahr für den Bediener dar, sofern sie in Übereinstimmung mit den von Mecc Alte vorgeschriebenen Anweisungen installiert, verwendet und gewartet werden und unter der Bedingung, daß die Schutzvorrichtungen stets in einem voll funktionstüchtigen Zustand gehalten werden.</p> <p>Aus den oben genannten Gründen ist es erforderlich, sich streng an die in diesem Handbuch angegebenen Anweisungen zu halten.</p> <p>Jegliche Form der Verbreitung und Reproduktion dieses Handbuchs ist verboten.</p>	<p>Los generadores de la serie NPE, responden a las directivas CEE 2006/42, 2006/95, 2004/108 y a sus respectivas modificaciones, por lo tanto no se presentan peligros para el operador, si instalados, usados y mantenidos según las instrucciones dadas por la Mecc Alte y con la condición que los dispositivos de seguridad sean mantenidos en una condición de perfecta eficiencia.</p> <p>Por esta razón es necesario adecuarse a la perfección a las instrucciones indicadas en este manual.</p> <p>Se prohíbe la reproducción total o parcial de este manual.</p>
<b>IDENTIFICATION DE LA MACHINE</b>	<b>MASCHINEN-IDENTIFIKATION</b>	<b>IDENTIFICACION MAQUINA</b>
<p>Pour toute demande auprès de Mecc Alte ou auprès des centres agréés autorisés, citer toujours le type et le code de l'alternateur.</p>	<p>Für Mitteilungen an Mecc Alte oder an die autorisierten Service-Zentralen, ist der Generatortyp und der Code anzugeben.</p>	<p>Para cualquier tipo de comunicación con la Mecc Alte o con los centros de reparación autorizados, indicar siempre el tipo y el código del generador.</p>
<b>VERIFICATION A LA LIVRAISON</b>	<b>ÜBERPRÜFUNG BEI LIEFERUNG</b>	<b>CONTROL A LA ENTREGA</b>
<p>A la livraison de l'alternateur, contrôler avec le bon de livraison qu'il n'y a aucun dommage ou de pièces manquantes; si c'est le cas, informer immédiatement l'expéditeur, l'assureur, le revendeur ou Mecc Alte.</p>	<p>Bei Lieferung des Generators ist anhand des Lieferscheins dieser auf Schäden, bzw. auf fehlende Teile hin zu überprüfen; in diesem Falle sind der Spediteur, die Versicherung, der Wiederverkäufer oder Mecc Alte umgehend darüber zu informieren.</p>	<p>A la entrega del generador, controlar junto con la factura que no existan defectos o piezas faltantes; en caso contrario informar inmediatamente la empresa de transportes, la compañía de seguros, el revendedor o la Mecc Alte S.p.A.</p>
<b>PRESCRIPTIONS DE SECURITE</b>	<b>SICHERHEITS-VORSCHRIFTEN</b>	<b>PRECAUCIONES DE SEGURIDAD</b>
<p>Avant une quelconque intervention de nettoyage, lubrification ou manutention, le moteur avec lequel est accouplé l'alternateur ne doit pas être en fonctionnement mais coupé de ses sources d'énergie.</p> <p>Pour couper un alternateur, il faut suivre scrupuleusement la procédure d'arrêt du système d'entraînement, l'alternateur n'est pas pourvu d'arrêt d'urgence, mais il s'arrête instantanément en fonction du système d'arrêt prévu par l'installateur.</p>	<p>Vor jedem Eingriff für Reinigung, Schmierung oder Wartung, muß der Hauptmotor, an den der Generator angeschlossen ist, außer Betrieb gesetzt werden; er muß stillstehen und von seinen Energiequellen isoliert werden.</p> <p>Um dem Generator zu stoppen, ist es erforderlich genauestens das Abstellverfahren für das Zugsystem einzuhalten; der Generator ist nicht mit einem Sicherheitsabschalter ("NOTAUS") versehen, sondern er stoppt unmittelbar in Abhängigkeit von dem Abschaltsystem, das vom Hersteller vorgesehen ist.</p>	<p>Antes de cualquier tipo de operación de limpieza, lubricación o mantenimiento, el motor primario al cual está acoplado el generador no debe estar en funcionamiento, el mismo deberá estar inmóvil y aislado de sus fuentes de energía.</p> <p>Para detener el generador es necesario seguir escrupulosamente los procedimientos de detención del sistema de arrastre; el generador no posee un Stop/Emergencia, pues el mismo se detiene instantáneamente en función del sistema de stop preparado por el instalador.</p>

## PRESCRIZIONI DI SICUREZZA

Durante la consultazione del presente manuale d'uso e manutenzione troverete alcuni simboli; questi hanno un preciso significato.

### SIMBOLOGIA CONVENZIONALE E SUA DEFINIZIONE

#### IMPORTANTE

Segnala al personale interessato che l'operazione descritta presenta un rischio che può avere come conseguenza un danno alla macchina, se non effettuata nel rispetto delle normative di sicurezza.

#### ACCORTEZZA

Segnala al personale interessato che l'operazione descritta presenta un rischio che può avere come conseguenza un danno alla macchina e/o lesioni al personale stesso, se non effettuata nel rispetto delle normative di sicurezza.

#### AVVERTIMENTO

Segnala al personale interessato che l'operazione descritta presenta un rischio che può avere come conseguenza lesioni gravi o morte, se non effettuata nel rispetto delle normative di sicurezza.

#### PERICOLO

Segnala al personale interessato che l'operazione descritta presenta un rischio immediato che ha come conseguenza lesioni gravi o morte, se non effettuata nel rispetto delle normative di sicurezza.

IMPORTANTE  
IMPORTANT  
WICHTIG



## SAFETY REQUIREMENTS

Symbols having specific meanings have been used throughout this instruction and maintenance manual.

### CONVENTIONAL SYMBOLS AND SYMBOL DESCRIPTION

#### IMPORTANT

This symbol warns the personnel concerned that the described operation may cause damages to the machine if it is not carried out according to the safety standards.

#### CAUTION

This symbol warns the personnel concerned that the described operation may cause damages to the machine and/or injures to the personnel if it is not carried out according to the safety standards.

#### WARNING

This symbol warns the personnel concerned that the described operation may cause serious injuries or death to the personnel if it is not carried out according to the safety standards.

#### DANGER

This symbol warns the personnel concerned that the described operation may immediately cause serious injuries or death to the personnel if it is not carried out according to the safety standards.

## PRESCRIPTIONS DE SECURITE

Pendant la consultation du présent manuel d'instruction et de maintenance, vous trouverez quelques symboles; ces ont une précis signification.

### SIMBOLIQUE CONVENTIONNEL ET DEFINITION

#### IMPORTANT

Signe au personnel intéressé que l'opération décrite présente, une risque qu'il peut avoir comme conséquence une damage au la machine, si n'effectué pas dans le respect des normes de securité.

#### ADRESSE

Signe au personnel intéressé que l'opération décrite présente, une risque qu'il peut avoir comme conséquence une damage ou lésiones graves au personnel même, si n'effectué pas dans le respect des normes de securité.

#### AVERTISSEMENT

Signe au personnel intéressé que l'exécution décrite présente une risque qu'il peut avoir comme conséquence une damage ou lésiones graves ou mort, si n'effectué pas dans le respect des normes de securité.

#### DANGER

Signe au personnel intéressé que l'exécution décrite présente une risque immédiat qu'il a comme conséquence une damage ou lésiones graves ou mort, si n'effectué pas dans le respect des normes de securité.

## SICHERHEITS VORSCHRIFTEN

Beim Nachschlagen in diesem Handbuch zur Bedienung und Wartung sind hier und da einige Symbole zu finden; diese haben eine bestimmte Bedeutung.

### ALLGEMEIN ÜBLICHE SYMBOLIK UND IHRE DEFINITION

#### WICHTIG

Signalisieren Sie dem zuständigen Personal, daß die beschriebene Arbeit ein Risiko darstellt, welches Schäden an der Maschine zur Folge haben kann; falls die Arbeit nicht unter voller Beachtung der Sicherheitsvorschriften erfolgt.

#### HINWEIS

Signalisieren Sie dem zuständigen Personal, daß die beschriebene Arbeit ein Risiko darstellt, welches Schäden an der Maschine und/oder Verletzungen des Personales selbst zur Folge haben kann; falls die Arbeit nicht unter voller Beachtung der Sicherheitsvorschriften erfolgt.

#### WARNHINWEIS

Dieses Symbol warnt das Personal, daß die hier beschriebene Operation eine eventuelle Gefahr darstellt, die ernste Verletzungen oder den Tod als Konsequenz zur Folge haben kann, wenn auszuführende Arbeit nicht nach den vorgeschriebenen Sicherheitsnormen durchgeführt wird.

#### GEFAHR

Dieses Symbol warnt das Personal, daß die hier beschriebene Operation eine sofortige Gefahr darstellt, die ernste Verletzungen oder den Tod als Konsequenz zur Folge haben kann, wenn auszuführende Arbeit nicht nach den vorgeschriebenen Sicherheitsnormen durchgeführt wird.

## PRECAUCIONES DE SEGURIDAD

Durante la consultación de el presente manual uso y manutention, aquíy allí hallerà algunos símbolos; Esos ont una preciso significado.

### SIMBOLOGIA CONVENCIONAL Y SUAS DEFINICION

#### IMPORTANTE

Signa a el personal interesado que el operation descrita presenta, una riesgo que puede hacer como consecuencia una daño a la maquina, se no efectuada en el respecto de les normativas de seguridad.

#### AGUDEZA

Signa a el personal interesado que el operation descrita presenta, una riesgo que puede hacer como consecuencia una daño a la maquina y/ou lésiones a el persoanl mismo, se no efectuada en el respecto de les normativas de seguridad.

#### ADVERTIMIENTO

Señales a los personales interesado que la operación descrita introduce un riesgo que él pueda tener como lesiones o muertos serios de la consecuencia, si no está realizado en el respecto de les normativas de seguridad.

#### PELIGRO

Señales a los personales interesado que la operación descrita introduce un riesgo inmediato que tenga como lesiones o muertos seriosn de la consecuencia, si no está realizado en el respecto de les normativas de seguridad.

## PRESCRIZIONI DI SICUREZZA

### ADDETTO ALLA MOVIMENTAZIONE

Identifica il tipo di operatore a cui è riservato l'intervento trattato.

Questa qualifica presuppone una piena conoscenza e comprensione delle informazioni contenute nel manuale d'uso del costruttore oltre che competenze specifiche dei mezzi di sollevamento, dei metodi e delle caratteristiche d'imbragatura e della movimentazione in sicurezza.



### MANUTENTORE MECCANICO

Identifica il tipo di operatore a cui è riservato l'intervento trattato.

Questa qualifica presuppone una piena conoscenza e comprensione delle informazioni contenute nel manuale d'uso del costruttore oltre che competenza specifica per effettuare gli interventi di installazione, regolazione, manutenzione, pulizia e/o riparazione.



### MANUTENTORE ELETTRICO

Identifica il tipo di operatore a cui è riservato l'intervento trattato.

Questa qualifica presuppone una piena conoscenza e comprensione delle informazioni contenute nel manuale d'uso del costruttore oltre che competenza specifica per gli interventi di natura elettrica di collegamento, regolazione, manutenzione e/o riparazione.

**E' in grado di operare in presenza di tensione all'interno di armadi e quadri elettrici.**



Nel caso di interventi straordinari e su autorizzazione scritta del servizio assistenza rivolgersi ai centri autorizzati Mecc Alte.

## SAFETY REQUIREMENTS

### HANDLER

This symbol identifies the type of operator in charge of the operation described. This qualification requires a complete knowledge and understanding of the information contained in the manufacturer's instruction manual as well as specific skills about the hoisting means, slinging methods and features and safe handling procedures.

### MECHANICAL SERVICE MAN

This symbol identifies the type of operator in charge of the operation described. This qualification requires a complete knowledge and understanding of the information contained in the manufacturer's instruction manual as well as specific skills necessary to perform installation, adjustment, maintenance, cleaning and/or repair operations.

### ELECTRICAL SERVICE MAN

This symbol identifies the type of operator in charge of the operation described. This qualification requires a complete knowledge and understanding of the information contained in the manufacturer's instruction manual as well as specific skills necessary to perform electrical operations such as connections, adjustment, maintenance and/or repair.

**The electrical service man must be able to work even in case electrical cabinets and panels are live.**

In case of exceptional operations and upon written request of servicing operations please apply to Mecc Alte authorized centers.

## PRESCRIPTIONS DE SECURITE

### PRÉPOSÉ A LA MOUVEMENTATION

Identifié le type de operateur dont il est reservé l'intervention traité.  
Cette qualification suppose une pleine connaissance et compréhension des renseignements contenu dans le manuel d'instruction du constructeur plus loin que compétences spécifiques de moyens du soulèvement, des méthodes et des caractéristiques d'éligage et du mouvementation en sécurité.

### PRÉPOSÉ MÉCANIQUE

Identifié le type de operateur dont il est reservé l'intervention traité.  
Cette qualification suppose une pleine connaissance et compréhension des renseignements contenu dans le manuel d'instruction du constructeur plus loin que compétences spécifiques pour effectuer les interventions d'installation, regulation, manutention, nettoyage et/ou réparation.

### PRÉPOSÉ ÉLECTRIQUE

Identifié le type de operateur dont il est reservé l'intervention traité.  
Cette qualification suppose une pleine connaissance et compréhension des renseignements contenu dans le manuel d'instruction du constructeur plus loin que compétences spécifiques de nature électrique de liaison, regulation, manutention, et/ou réparation.

**Il est en degré de agir en présence de tension à l'intérieur des armoires et tableaux électriques.**

En cas des interventions extraordinaires et sur autorisation écrite du service et assistance s'adresser aux centres autorisés Mecc Alte.

## SICHERHEITS VORSCHRIFTEN

### TRANSPORTBEAUFTRAGTER

Identifiziert den Personentyp, der mit dem Transport bzw. der Bewegung der Maschine beauftragt ist.  
Diese Qualifikation setzt eine volle Kenntnis und Verständnis der im Bedienungshandbuch des Herstellers enthaltenen Informationen voraus, zusätzlich zu den spezifischen Kompetenzen, was die Transport- und Anhebemittel, die Eigenschaften der Transportschlingen und der sicheren Bewegung betrifft.

### WARTUNGSFACHMANN MECHANIK

Identifiziert den Personentyp, der mit der mechanischen Wartung beauftragt ist. Diese Qualifikation setzt eine volle Kenntnis und Verständnis der im Bedienungshandbuch des Herstellers enthaltenen Informationen voraus, zusätzlich zu den spezifischen Kompetenzen, was die Aufstellungs-, Einstellungs-, Wartungs-, Reinigungs- und/oder Reparaturarbeiten betrifft.

### WARTUNGSFACHMANN ELEKTRIK

Identifiziert den Personentyp, der mit der elektrischen Wartung beauftragt ist. Diese Qualifikation setzt eine volle Kenntnis und Verständnis der im Bedienungshandbuch des Herstellers enthaltenen Informationen voraus, zusätzlich zu den spezifischen Kompetenzen, was die Eingriffe elektrischer Natur betrifft, wie: Anschlüsse, Einstellung, Wartung und/oder Reparaturen.

**Er ist in der Lage, auch Arbeiten im Inneren von Schaltschränken und -tafeln auszuführen, wenn diese unter Spannung stehen.**

Im Fall von außergewöhnlichen Eingriffen und Unklarheiten der Beschreibung des techn. Services, wenden Sie sich bitte an die autorisierten Kundendienstzentren von Mecc Alte.

## PRECAUCIONES DE SEGURIDAD

### APLICADO A LA MOVIMENTACION

Identifica el tipo de operador la cual es reservado el intervencióntartado.  
Esta calificación presupone una llena conocimiento y comprensión des informaciones contenidos en el manual para uso de el constructor de la parte de allá que competencia especificación des medios de levantamiento, des métodos y des características de barrachera y de movimentación en seguridad.

### MANUTENDOR MECANICO

Identifica el tipo de operador la cual es reservado el intervencióntartado.  
Esta calificación presupone una llena conocimiento y comprensión des informaciones contenidos en el manual para uso de el constructor de la parte de allá que competencia especificación por efectuar los intervenciones de instalación, regulaci3n, manutenci3n, limpieza y/ou reparaci3n.

### MANUTENDOR ELÉCTRICO

Identifica el tipo de operador la cual es reservado el intervencióntartado.  
Esta calificación presupone una llena conocimiento y comprensión des informaciones contenidos en el manual para uso de el constructor de la parte de allá que competencia especificación por efectuar los intervenciones de natura electrica de coligamiento, regulaci3n, manutenci3n, y/ou reparaci3n.

**Es en grado de trabajar en presencia de tension a los interno des armarios y cuadros electricos.**

En caso de intervenciones extraordinarias y su autorizaci3n escrita du servicio asistencia revolverse a los centros autorizado Mecc Alte.

## PRESCRIZIONI DI SICUREZZA

Al momento dell'installazione le norme prevedono che il generatore sia collegato a terra. Per questa ragione assicurarsi che l'impianto di messa a terra sia efficiente ed in conformità con le direttive del paese dove il generatore sarà installato.

### ATTENZIONE

**L'INSTALLATORE FINALE E' RESPONSABILE DELLA PREDISPOSIZIONE DI TUTTE LE PROTEZIONI (DISPOSITIVI DI SEZIONAMENTO, PROTEZIONI CONTRO I CONTATTI DIRETTI E INDIRETTI, PROTEZIONI CONTRO SOVRACORRENTI E SOVRATENSIONI, ARRESTO DI EMERGENZA ECC.) NECESSARIE PER RENDERE CONFORME IL MACCHINARIO E L'IMPIANTO UTILIZZATORE, ALLE VIGENTI NORME DI SICUREZZA INTERNAZIONALI/ EUROPEE.**

Per la movimentazione dei generatori disimballati usare sempre ed esclusivamente gli appositi golfari.

Utilizzare funi di portata adeguata senza sollevare il generatore troppo dal pavimento (max 30 cm.).

Alla fine del periodo di vita della macchina, rivolgersi alle agenzie di smaltimento materiali ferrosi e non disperderne parti nell'ambiente.

Gli addetti all'installazione, conduzione e manutenzione del generatore devono essere tecnici adeguatamente qualificati e che conoscano le caratteristiche dei generatori.

Le persone addette alla movimentazione devono sempre indossare guanti da lavoro e scarpe antinfortunistiche.

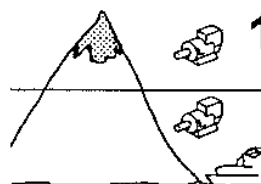
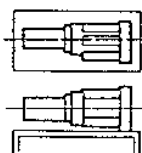
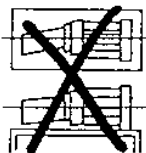
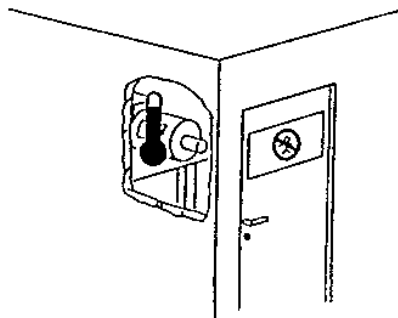
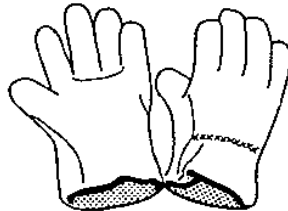
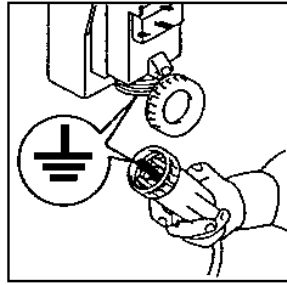
Qualora il generatore o l'intero impianto debba essere sollevato da terra, gli operatori devono usare un casco protettivo.

Il generatore va installato in un ambiente aerato. Se non c'è sufficiente aria oltre al mal funzionamento esiste pericolo di surriscaldamento. Sulla porta di ingresso del locale ci deve essere un cartello indicante il divieto di accesso alle persone non autorizzate.

Assicurarsi che il basamento del generatore e del motore primario sia calcolato per sopportare il peso e tutti gli eventuali sforzi dovuti al funzionamento.

L'installatore deve collegare la macchina perfettamente in asse al motore primario; in caso contrario l'insieme può generare vibrazioni pericolose.

La macchina è stata progettata per garantire la potenza nominale in ambienti con temperatura massima di 40°C e altitudine inferiore ai 1000 metri; per condizioni diverse vedere il catalogo commerciale (depliant).



1000m

40°C

## SAFETY REQUIREMENTS

Before installing the generator, arrangements must be made to earth the machine. This is the reason why you must make sure that the grounding system is in good conditions and in compliance with the regulations of the country where the generator will be installed.

### CAUTION

**THE FINAL INSTALLER IS RESPONSIBLE FOR THE INSTALLATION OF ALL THE PROTECTIONS (SECTIONING DEVICES, PROTECTIONS AGAINST DIRECT AND INDIRECT CONTACTS, OVERCURRENT AND OVERVOLTAGE PROTECTIONS, EMERGENCY STOP, ETC.) NECESSARY FOR THE MACHINE TO COMPLY WITH THE EXISTING INTERNATIONAL/EUROPEAN SAFETY REGULATIONS.**

For handling the unpacked generators, always use the special eyebolts only; use ropes having a suitable carrying capacity and do not lift the generator too much from the floor (max 30 cm.).

When the machine is worn out, contact the companies in charge of the disposal of ferrous material and do not throw away its parts into the environment.

The operators in charge of the installation, operation and maintenance of the generators must be skilled technicians who know the characteristics of the generators.

The people in charge of the handling must always wear work gloves and safety shoes. In case the generator or the whole plant must be lifted from the floor, the operators must wear a safety helmet.

The generator must be installed in an airy room. If there is not enough air, a malfunction or an overheating may occur.

All entry doors into generator room should be clearly marked "Authorized persons only".

Make sure that gen-set foundations and baseframe are suitable to bear the combined weight of the alternators and prime mover.

The alternator should be securely connected and perfectly aligned with the prime mover, otherwise dangerous vibrations may occur.

The machine has been designed to ensure the rated output when it is installed in rooms having a max temperature of 40°C and at an altitude not exceeding 1000 meters; in case of different conditions, please make reference to our catalogue (brochure).

## PRESCRIPTIONS DE SECURITE

Au moment de l'installation, les normes prévoient que l'alternateur soit relié à la terre. Pour cette raison, s'assurer que l'installation de mise à la terre fonctionne bien et soit en conformité avec les directives du pays ou le générateur sera installé.

### ATTENTION

**L'INSTALLATEUR FINAL EST RESPONSABLE DE LA MISE EN PLACE DE TOUTES LES PROTECTIONS NÉCESSAIRES (DISPOSITIFS DE PROTECTION ET DE COUPURE, PROTECTIONS CONTRE LES CONTACTS DIRECTS ET INDIRECTS, PROTECTIONS CONTRE LES SURCHARGES ET LES SUR-TENSIONS, ARRÊT D'URGENCE ETC.), POUR RENDRE CONFORME LE MATÉRIEL ET SON IMPLANTATION AUX NORMES DE SÉCURITÉ INTERNATIONALES ET EUROPÉENNES EN VIGUEUR.**

Pour le déplacement des alternateurs emballés, utiliser toujours et exclusivement les points d'encrage, utiliser les moyens de levage adéquats sans trop soulever l'alternateur du sol (max. 30 cm).

A la fin de la période de vie de la machine, s'adresser aux organismes de recyclage du matériel concerné.

Les ouvriers, conducteurs et manutentionnaires de l'alternateur doivent être techniquement qualifiés et connaître les caractéristiques du générateur.

Les personnes employées à la manutention doivent avoir des gants et des chaussures de sécurité. Dans le cas où l'alternateur ou le groupe électrogène doivent être soulevés de terre, les opérateurs doivent utiliser un casque de protection.

L'alternateur doit être installé dans un endroit aéré. Si la quantité d'air n'est pas suffisante, outre un mauvais fonctionnement, il existe aussi un risque de surchauffe. Sur la porte d'entrée du local il doit y avoir un écriteau indiquant "entrée interdite aux personnes non autorisées".

S'assurer que le châssis, support de l'alternateur et du moteur, est calculé pour supporter la masse totale.

L'installateur doit monter la machine parfaitement dans l'axe du moteur d'entraînement. Dans le cas contraire, l'ensemble peut générer des vibrations dangereuses.

La machine est prévue pour garantir sa puissance nominale à une température ambiante de 40°C max, et pour une altitude inférieure à 1000 m. Pour des conditions différentes, voir le catalogue commercial (dépliant).

## SICHERHEITS VORSCHRIFTEN

Bei der Installation ist, gemäß Vorschriften, darauf zu achten, daß der Generator geerdet wird. Aus diesem Grunde ist es erforderlich sicherzustellen, daß die Erdungsanlage leistungsfähig ist und mit den Vorschriften des Landes, in dem der Generator installiert wird, übereinstimmt.

### ACHTUNG

**DER ENDMONTEUR IST VERANTWORTLICH FÜR DIE VOREINSTELLUNG UND VORBEREITUNG ALLER SCHUTZVORRICHTUNGEN (TRENNVORRICHTUNGEN, SCHUTZVORRICHTUNGEN GEGEN DIREKTES- UND INDIREKTES BERÜHREN, SCHUTZVORRICHTUNGEN GEGEN ÜBERSTROM UND ÜBERSpannung, NOTAUS, ETC.), DIE MASCHINE UND DIE ANLAGE DES ANWENDERS AN DIE GÜLTIGEN INTERNATIONALEN UND EUROPÄISCHEN SICHERHEITSVORSCHRIFTEN ANZUPASSEN.**

Für den Transport der nicht verpackten Generatoren sind immer und ausschließlich die entsprechend geeigneten Transportösen zu verwenden. Es sind Seile mit geeigneter Tragfähigkeit zu verwenden, ohne den Generator zu sehr von der Bodenfläche anzuheben (max. 30 cm).

Am Ende der Lebensdauer der Maschinen ist sich an die Entsorgungsunternehmen für Eisenmaterialien zu wenden; Teile dürfen nicht einfach weggeworfen werden.

Das für Installation, Bedienung und Wartung zuständige Personal muß aus entsprechend qualifizierten Technikern bestehen, die die Eigenschaften des Generators genau kennen.

Die für den Transport zuständigen Personen haben stets Arbeitshandschuhe und Schuhwerk gemäß den Unfallverhütungsvorschriften zu tragen. Sofern der Generator oder die gesamte Anlage vom Boden angehoben werden müssen, haben die Arbeiter ein Schutzelm zu verwenden.

Der Generator muß in einem belüfteten Raum installiert werden. Wenn ausreichende Belüftung nicht gegeben ist, besteht die Gefahr fehlerhaften Funktionierens und der Überhitzung. An der Eintrittstür zu diesem Raum ist ein Schild anzubringen, das den Eintritt für nicht autorisierte Personen untersagt.

Es ist sicherzustellen, daß der Untergrund für den Generator und den Hauptmotor so berechnet ist, daß er das Gewicht tragen kann.

Der Aufsteller muß die Maschine genau auf der Mittellinie mit dem Hauptmotor anschließen; andernfalls kann die Konstruktion gefährliche Schwingungen auslösen.

Die Maschinen wurde projektiert, um die Nennleistung bei einer maximalen Umgebungstemperatur von 40°C und einer Höhe unterhalb von 1000 Metern zu gewährleisten. Sollen andere Voraussetzungen erfüllt werden, konsultieren sie bitte unseren Handbuchs katalog.

## PRECAUCIONES DE SEGURIDAD

Al momento de la instalación, las normas prevén la conexión a tierra del generador. Por lo tanto es necesario que la instalación de puesta a tierra sea eficiente y en conformidad con las directivas del país donde el generador será montado.

### ATENCIÓN

**EL INSTALADOR FINAL ES RESPONSABLE DEL MONTAJE DE TODAS LAS PROTECCIONES (DISPOSITIVOS DE SECCIONAMIENTO, PROTECCIONES CONTRA CONTACTOS DIRECTOS E INDIRECTOS, PROTECCIONES CONTRA SOBRECORRIENTE Y SOBRETENSION, PARADA DE EMERGENCIA, ETC.), NECESARIAS PARA PRODUCIR LA CONFORMIDAD DE LAS MAQUINAS Y LA INSTALACION CON LAS NORMAS VIGENTES DE SEGURIDAD INTERNACIONALES Y EUROPEAS.**

Para mover los generadores desempaquetados, usar siempre y exclusivamente los correspondientes ganchos que poseen los mismos. Utilizar correas de resistencia adecuada sin necesidad de elevar demasiado el generador del pavimento (max 30 cm).

Al final del periodo de vida útil de la máquina, dirigirse a una agencia de reciclaje de materiales ferrosos, de manera de no perder partes en el ambiente.

Las personas dedicadas a la instalación, transporte y mantenimiento del generador deberán ser técnicos adecuadamente calificados y que conozcan las características de los generadores.

Las personas dedicadas al transporte deberán usar siempre guantes de trabajo y zapatos de seguridad. Siempre que el generador o el equipo completo sea elevado del suelo, los operadores deberán usar cascos de protección.

El generador debe ser instalado en un ambiente aireado.

Si no hay suficiente ventilación, además del mal funcionamiento existirá el peligro de sobrecalentamiento.

A la puerta de ingreso del local se deberá colocar un cartel que prohíba el acceso a las personas no autorizadas.

Asegurarse que la base de apoyo del generador y del motor primario sean calculadas para soportar el peso total.

El instalador deberá acoplar el generador coaxialmente con el motor primario, en caso contrario, todo el conjunto podrá tener peligrosas vibraciones.

La máquina eléctrica fue diseñada para garantizar la potencia nominal con una temperatura ambiente máxima de 40 °C y una altitud inferior a 1000 m; para condiciones diferentes ver el catálogo comercial (depliant).



## PRESCRIZIONI DI SICUREZZA

Nelle vicinanze della macchina non ci devono essere persone con indumenti svolazzanti tipo: sciarpe, fular, bracciali, etc e qualsiasi indumento deve essere chiuso con elastici alle estremita'.

I generatori non devono mai e per nessuna ragione funzionare con le seguenti protezioni aperte:

- ) copertura morsetti.
- ) coperchi frontali.
- ) protezioni delle ventole.

In alcuni tipi di generatore i regolatori sono corredati di 3 led :

**Verde** - funzionamento regolare

**Giallo** - intervento protezione sovraccarico

**Rosso** - intervento protezione bassa velocita'.

I generatori sono rumorosi; anche se il livello acustico è sicuramente inferiore a quello del motore primario, devono essere installati in ambienti isolati (stanza, sala macchine, etc.) e chi vi accede deve munirsi di cuffie antirumore.

I generatori sviluppano calore anche elevato in funzione della potenza generata.

Pertanto non toccare il generatore se non con guanti antiscottatura e attendere, una volta spento, che esso raggiunga la temperatura ambiente.

Anche se la macchina e' protetta in tutte le sue parti evitare di sostare nelle sue vicinanze.

Per nessuna ragione appoggiarsi o sedersi sul generatore.

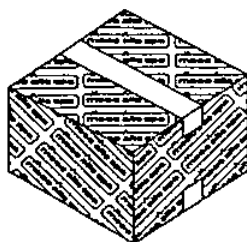
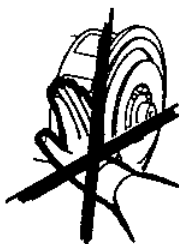
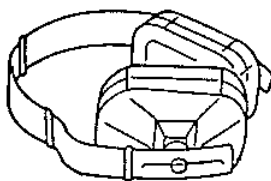
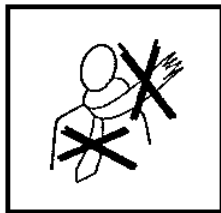
Non togliere per nessuna ragione le etichette, anzi richiederne la sostituzione in caso di necessita'.

### PERICOLO DI CORTO CIRCUITO

Il generatore e' costruito con grado di protezione IP21; pertanto e' fatto divieto di utilizzare qualsiasi tipo di idropulitrice e di spruzzare liquidi sopra le parti elettriche.

In caso di sostituzione di pezzi di ricambio richiedere esclusivamente ricambi originali.

Per la sostituzione di parti usurate comportarsi rigorosamente come descritto al capitolo manutenzione; queste manutenzioni devono essere eseguite da tecnici adeguatamente qualificati.



## SAFETY REQUIREMENTS

No person must wear fluttering clothes (such as scarves, etc.) near the machine and any garment must be fastened with elastic bands at its ends.

The generators must never and for no reason run with following guards removed:

- ) terminals cover
- ) front covers
- ) fan guards.

In some machines the regulators are equipped with 3 leds :

**Green led** - correct operation

**Yellow led** - overload protection on

**Red led** - low speed protection on.

The generators are noisy; even if the sound level is certainly lower than that of the prime motor, they must be installed in soundproof rooms (room, engine room, etc.) where it is necessary to wear antinoise protectors.

The generators produce heat proportional to the output.

Therefore, do not touch the generator if you do not wear antiscorch gloves and, after switching it off, do not touch it until it has cooled down.

Even if all the machine components are protected, keep away from the machine.

Do not lean or sit on the generator for whatever reason.

Do not remove the labels for whatever reason; on the contrary, if necessary, replace them.

### DANGER OF SHORT CIRCUIT

the degree of protection of the generator is IP21; therefore it is made prohibition to use whichever type of hydrocleaner and to spray liquids over the parts containing electrical components.

In case of replacement of spare parts, use original spare parts only.

For the replacement of worn parts, carefully follow the maintenance instructions; these operations must be carried out by skilled technicians.

## PRESCRIPTIONS DE SECURITE

Dans le voisinage de la machine, il ne doit y avoir aucune personne portant des vêtements flottants type écharpe, foulard... et quelque soit le vêtement, il doit être fermé avec un élastique à l'extrémité.

Les alternateurs ne doivent jamais et pour aucune raison fonctionner avec les protections suivantes ouvertes:

- ) couvercle de boîte à bornes
- ) fermeture frontale
- ) protection du ventilateur.

Pour chaque installation les régulateurs sont accompagnés de 3 led :

**Vert** - Fonctionnement normal et correct  
**Jaune** - intervention de protection de surcharge  
**Rouge** - intervention de protection de sous vitesse.

La machine génère du bruit même si son niveau est inférieur à celui du moteur, il doit être alors installé dans un local isolé, et il est nécessaire pour les personnes d'être munies de casque antibruit.

Les alternateurs produisent de l'énergie calorifique directement proportionnelle à la puissance utilisée.

Ainsi, ne pas toucher l'alternateur ou bien avec des gants appropriés, et attendre que celui-ci une fois arrêté soit de nouveau à la température ambiante.

La machine est protégée dans tout son environnement, éviter de rester dans son voisinage.

Pour aucune raison, il ne faut s'appuyer ou s'asseoir sur l'alternateur.

Ne pas arracher non plus les étiquettes ou adhésifs, au contraire, les réclamer en cas de nécessité.

### DANGER DE COURT CIRCUIT

Le générateur est construit avec le degré de protection IP21; donc on lui fait à prohibition pour utiliser n'importe quel type de hydroébarbeuse et pour pulvériser des liquides au-dessus des ouvriers électriques de pièces.

En cas de changement de tout composant, il est indispensable de les remplacer par les pièces d'origine .

Ces modifications doivent être exécutées par du personnel technique qualifié.

## SICHERHEITS VORSCHRIFTEN

In der Nähe der Maschinen dürfen sich keine Personen aufhalten, die nicht eng anliegende Kleidungs- oder Schmuckstücke tragen (wie z.B. Schals, Tücher, Armbänder, usw.). Jedes Kleidungsstück muß an den Gelenken durch Gummis geschlossen werden.

Die Generatoren dürfen niemals und aus keinem Grund in Betrieb sein, wenn folgende Schutzvorrichtungen geöffnet sind:

- ) Klemmenabdeckung
- ) Frontdeckel, Abdeckungen,
- ) Schutzvorrichtungen des Lüfterrades.

Bei einigen Installationen sind die Regler mit drei LED's :

**grün** -Normalbetrieb  
**gelb** -Sicherheitseingriff  
Überlastung  
**rot** -Sicherheitseingriff geringe Drehzahl.

Die Generatoren sind laut; auch wenn der Geräuschpegel durchaus unterhalb dem Pegel des Hauptmotors liegt, müssen sie in isolierten Räumlichkeiten (Räume, Maschinenräume, usw.) aufgestellt werden. Personen, die diese Räume betreten, müssen sich mit Kopfhörern vor dem Lärm schützen.

Die Generatoren entwickeln Wärme auch in erhöhtem Maße, jeweils in Abhängigkeit von der erzeugten Leistung. Aus diesem Grunde ist die Maschine nur mit Verbrennungsschutzhandschuhen zu berühren.

Ist die Maschine ausgeschaltet, ist abzuwarten, daß diese wieder Umgebungstemperatur annimmt.

Auch wenn die Maschine vollständig abgesichert ist, ist der Aufenthalt in ihrer Nähe zu vermeiden.

Aus keinem Grunde darf man sich an den Generator lehnen oder sich auf ihn setzen.

Aus keinem Grunde sind die Etiketten zu entfernen, stattdessen ist bei Bedarf Ersatz anzufordern.

### GEFAHR VON KURZSCHLÜSSEN

Der Generator wird in der Schutzart IP21 konstruiert; folglich ist es verboten die elektrischen Teile zu bespritzen und Behälter mit Flüssigkeiten auf diese zu stellen.

Müssen Teile ausgewechselt werden, sind ausschließlich originale Ersatzteile anzufordern.

Beim Austausch von Verschleißteilen müssen die im Kapitel "Wartung" angegebenen Vorschriften strengstens eingehalten werden; diese Wartungsarbeiten müssen von entsprechend qualifizierten Technikern durchgeführt werden.

## PRECAUCIONES DE SEGURIDAD

En proximidades de la máquina no deberá haber personas con indumentaria volante como pulseras, bufandas, etc. Cualquier otro tipo de indumentaria deberá ser fijada con elásticos en las extremidades.

Los generadores no deberán bajo ninguna condición funcionar con las siguientes protecciones descubiertas:

- ) tapa de bornes
- ) tapas frontales
- ) protección de ventilador.

En algunas instalaciones los reguladores electrónicos poseen 3 leds :

**Verde** -Funcionamiento correcto  
**Amarillo** -Actuación de la protección de sobrecarga  
**Rojo** -Actuación de la protección de baja velocidad.

Los generadores son ruidosos, y si bien su nivel acústico es seguramente inferior al motor primario, los mismos deberán ser instalados en ambientes aislados (cabina, sala máquinas, etc.) y las personas que acceden deberán llevar auriculares antiruido.

Los generadores producen calor, y el mismo puede ser elevado en función de la potencia generada, por lo tanto no tocar la máquina si no se posee guantes antiquemaduras, después de un tiempo de haber detenido el generador, hasta que el mismo alcance la temperatura ambiente.

Si bien la máquina está protegida en todas sus partes, evitar de pararse cerca de la misma.

Por ninguna razón apoyarse o sentarse sobre el generador.

No quitar por ninguna razón las etiquetas, por el contrario, pedir la sustitución en caso de necesidad.

### PELIGRO DE CORTOCIRCUITO

El generador es construido con el grado de protección IP21; por lo tanto se hace prohibición para utilizar cualquier tipo de hidrocleaner y rociar líquidos concluido sobre las piezas eléctricas.

En caso de sustitución de partes de repuesto, exigir exclusivamente repuestos originales.

Para la sustitución de partes usadas, comportarse rigurosamente como descrito en el capítulo mantenimiento; estas operaciones deberán ser realizadas por técnicos adecuadamente calificados.

## TRASPORTO E IMMAGAZZINAMENTO

## TRANSPORT AND STORAGE

**PERICOLO  
DANGER**



**GEFAHR  
PELIGRO**

In funzione della destinazione, gli alternatori possono essere imballati per la spedizione in vari modi.

In ogni caso per movimentarli, osservare nella bolla di accompagnamento, il peso, e con mezzi adeguati, sollevarli da terra il meno possibile.

Nel caso che l'imballo debba essere movimentato con carrelli, occorre che le forche siano tenute più larghe possibile, in modo da evitare cadute o scivolamenti.

In caso di immagazzinamento, gli alternatori imballati e non, devono essere depositati in un locale fresco e asciutto e comunque mai esposto alle intemperie.

Una volta disimballato il generatore, non scollegare il sistema di fissaggio rotore, in quanto quest'ultimo potrebbe scivolare.

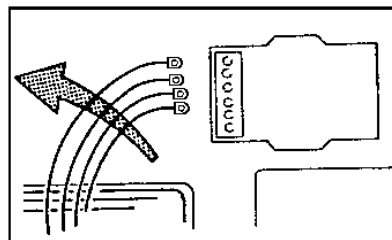
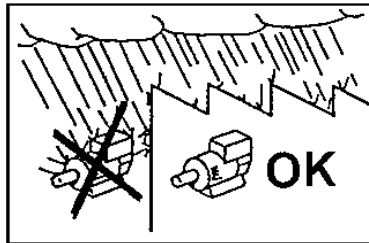
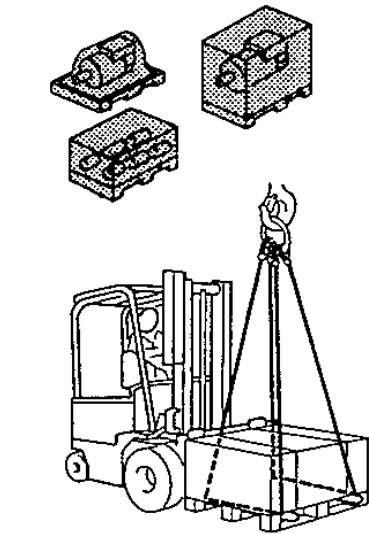
Per la movimentazione al fine dell'installazione, sollevare i generatori, sempre, attraverso i propri golfari.

### IMPORTANTE:

**DOPO LUNGHI PERIODI DI IMMAGAZZINAMENTO O IN PRESENZA DI SEGNI EVIDENTI DI UMIDITA' / CONDENZA, VERIFICARE LO STATO D'ISOLAMENTO.**

**LA PROVA DI ISOLAMENTO DEVE ESSERE ESEGUITA DA UN TECNICO ADEGUATAMENTE QUALIFICATO.**

**PRIMA DI ESEGUIRE TALE PROVA E' NECESSARIO SCONNETTERE IL REGOLATORE DI TENSIONE; SE LE PROVE DARANNO UN RISULTATO TROPPO BASSO (INFERIORE A 1 MΩ) SI DOVRA' ASCIUGARE L'ALTERNATORE IN UN FORNO A 50 - 60°C.**



Alternators will be packed for shipment in a manner suitable to their mode of transport and final destination.

Prior to handling goods, please ensure that lifting equipment is of sufficient capacity. Under lifting conditions machinery should be elevated to a minimal distance from the ground.

When lifting or moving goods by forklift apparatus, care should be taken to ensure that forks are correctly positioned to prevent slipping or falling of pallet or crate.

Both packed and unpacked alternators shall be stored in a cool and dry room, and shall never be exposed to the inclemency of the weather.

With regard to single bearing alternators please ensure that the rotor securing device is in place. Failure to do so may lead to slippage or assembly.

When installing the alternators, always lift them by using their eyebolts.

### IMPORTANT :

**AFTER PROLONGER STORAGE OR IF THE MACHINES SHOW SIGNS OF CONDENSATION, ALL WINDINGS SHOULD BE SUBJECTED TO INSULATION TESTS PRIOR TO OPERATING.**

**THE INSULATION TEST SHALL BE MADE BY SKILLED PERSONNEL.**

**BEFORE CARRYING OUT THE TEST, THE VOLTAGE REGULATOR MUST BE DISCONNECTED; IF THE TEST RESULTS ARE TOO LOW (LOWER THAN 1 MΩ) THE ALTERNATOR MUST BE DRIED IN AN OVEN AT 50-60°C.**

## TRANSPORT ET STOCKAGE

## TRANSPORT UND LAGERUNG

## TRANSPORTE Y DEPOSITO

**PERICOLO  
DANGER**



**GEFAHR  
PELIGRO**

En fonction de la destination des alternateurs, ils peuvent être emballés pour l'expédition de différentes manières.

En cas de déplacement des caisses, il est nécessaire de contrôler sur le bordereau de livraison le poids et, avec du matériel adéquate les soulever de terre le moins haut possible.

Dans le cas où l'emballage devra être déplacé avec des chariots élévateurs, il est nécessaire que les sangles soient tenues le plus large possible de façon à éviter des chutes ou des glissements.

En cas de stockage, les alternateurs emballés ou non, doivent être déposés dans un local frais et aéré et jamais exposés aux intempéries.

Une fois l'alternateur sorti de l'emballage, ne pas enlever le système de fixation du rotor, car dans ce cas, ce dernier pourrait glisser.

Pour les maintenances à la fin de l'installation, soulever les alternateurs, toujours avec leurs propres anneaux de levage.

### IMPORTANT :

**APRÈS DE LONGUES PÉRIODES DE STOCKAGE OU EN PRÉSENCE DE SIGNES ÉVIDENTS D'HUMIDITÉ / CONDENSATION, VÉRIFIER L'ÉTAT D'ISOLEMENT.**

**L'ESSAI D'ISOLEMENT DOIT ÊTRE EXÉCUTÉ PAR UN TECHNICIEN QUALIFIÉ.**

**AVANT DE PROCÉDER À UN TEL ESSAI, IL EST NÉCESSAIRE DE DÉCONNECTER LE RÉGULATEUR DE TENSION; SI LES VALEURS MESURÉES SONT INFÉRIEUR À CELLES REQUISES (INFÉRIEUR À 1 MΩ) IL EST NÉCESSAIRE DE SUPPRIMER L'HUMIDITÉ EN METTANT L'ALTERNATEUR DANS UN FOUR À 50-60°C.**

In Abhängigkeit von dem Zielort, können die Generatoren entsprechend auf verschiedene Art und Weise für den Versand verpackt werden.

In jedem Fall sind für den Transport die Angaben des begleitenden Lieferscheins bezüglich Gewicht zu beachten; der Generator soll mit geeigneter Hilfsmittel so wenig wie möglich vom Boden hochgehoben werden.

Sollte die Verpackung mit dem Generator mit Gabelstaplern bewegt werden müssen, ist es erforderlich, die Gabelstellung so weit wie möglich einzustellen, um dadurch zu verhindern, daß die Verpackung herunterfallen oder herunterrutschen kann.

Die Lagerung von verpackten und unverpackten Generatoren muß in einem kühlen und trockenen Raum erfolgen, der keinesfalls Witterungseinflüssen ausgesetzt ist.

Sobald der Generator aus seiner Verpackung entnommen ist, darf die Sicherungsvorrichtung für den Rotor nicht entfernt werden, da dieser abrutschen könnte.

Zum Transport der Generatoren für Installationszwecke, dürfen diese stets ausschließlich an ihren dafür vorgesehenen Ringschrauben aufgehängt werden.

### WICHTIG :

**NACH EINER LÄNGEREN LAGERUNGSZEIT ODER BEI DEUTLICHEN ANZEICHEN VON FEUCHTIGKEIT ODER KONDENSAT, IST DER ZUSTAND DER ISOLIERUNGEN ZU ÜBERPRÜFEN.**

**DIE ÜBERPRÜFUNG DER ISOLIERUNG DARF NUR VON EINEM FACHMANN DURCHGEFÜHRT WERDEN.**

**VOR DER DURCHFÜHRUNG EINER SOLCHEN PRÜFUNG IST ES ERFORDERLICH, DEN SPANNUNGSREGLER ABZUTRENNEN; SOLLTE DIE ÜBERPRÜFUNG EIN ZU NIEDRIGES ERGEBNIS ERBRINGEN, (UNTERHALB VON 1 MΩ), MUß DER GENERATOR IN EINEM OFEN BEI 50-60°C GETROCKNET WERDEN.**

En función del destino final, los alternadores podrán ser embalados para su expedición en varios modos.

En todos los casos, para moverlos, observar en la factura, el peso y con los medios adecuados, elevarlos del piso lo menos posible.

En caso que el embalaje sea movido por medio de un elevador, será necesario que las cuerdas del mismo ocupen todo la base de la caja, para evitar caídas o deslizamientos.

En caso de depósito, los alternadores con o sin embalaje, deberán ser puestos en un lugar fresco y seco o por lo menos nunca ser expuestos a la intemperie.

Una vez desembalado el generador, no quitar el sistema de fijación del rotor, pues de otra manera el mismo podría deslizarse y caer.

Para mover los generadores antes de su instalación, elevarlos siempre por medio de sus ganchos respectivos.

### IMPORTANTE :

**DESPUES DE LARGOS PERIODOS DE DEPOSITO O EN PRESENCIA DE EVIDENTES SIGNOS DE HUMEDAD O CONDENSACION, CONTROLAR EL ESTADO DE AISLACION.**

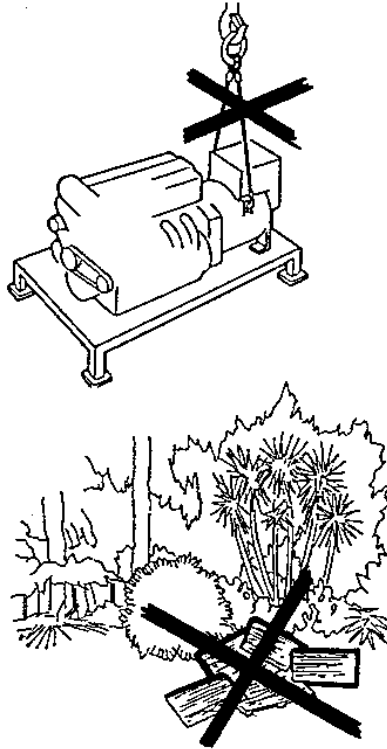
**LA PRUEBA DE AISLACION DEBE SER EFECTUADA POR UN TECNICO ADECUADAMENTE CALIFICADO.**

**ANTES DE REALIZAR LA PRUEBA ES NECESARIO DESCONECTAR EL REGULADOR DE TENSION; SI LOS RESULTADOS SON DEMASIADO BAJOS (INFERIOR A 1MΩ), SE DEBERA SECAR EL ALTERNADOR EN UN HORNO A 50-60°C.**

## TRASPORTO E IMMAGAZZINAMENTO

Ricordarsi che, una volta che il generatore sarà accoppiato al motore primario, o montato su un basamento, o installato in un telaio in modo da formare un corpo unico, non dovrà più essere sollevato dai propri golfari ma si dovranno seguire le indicazioni dell'installatore.

Non disperdere l'imballo nell'ambiente, ma rivolgersi alle agenzie di smaltimento.



## TRANSPORT AND STORAGE

Once the generator is coupled with an engine, mounted on a baseframe, or installed on a complete generating set, it cannot be lifted by its lifting bolts. The relevant instructions for lifting complete generating set should be followed.

Any packing materials should be disposed of via correct waste disposal methods. Do not discard waste materials into the environment.

## ACCOPPIAMENTO MECCANICO

Con il fine di proteggere, durante il trasporto e l'immagazzinamento, la flangia di accoppiamento o la estremità d'albero, a tali parti meccaniche viene applicata una vernice antiruggine facilmente rimovibile. Tale sostanza **DEVE ESSERE assolutamente RIMOSSA** prima dell'assemblaggio finale.

L'accoppiamento del generatore al motore primo è a cura dell'utilizzatore finale ed è eseguito secondo la sua sola discrezione.

Le attenzioni richieste sono:

**NELLA MESSA IN SERVIZIO AVER CURA CHE LE APERTURE DI ASPIRAZIONE E SCARICO DELL'ARIA DI RAFFREDDAMENTO SIANO SEMPRE LIBERE.**

IL LATO DI ASPIRAZIONE NON DEVE ESSERE VICINO A SORGENTI DI CALORE. IN OGNI CASO, SE NON SPECIFICAMENTE CONCORDATO, LA TEMPERATURA DELL'ARIA DI RAFFREDDAMENTO DEVE ESSERE QUELLA AMBIENTE E COMUNQUE NON SUPERIORE A 40°C.

**PRIMA DI PROCEDERE ALL'ACCOPPIAMENTO MECCANICO DEI GENERATORI MONOSUPPORTO, RIMUOVERE IL SISTEMA DI FISSAGGIO ROTORE, CHE IMPEDISCE ALLO STESSO DI SFILARSI DURANTE LA MOVIMENTAZIONE.**



## MECHANICAL COUPLING

For transit and storage purposes the generator flange spigot and the generator end shaft have been coated with a rust preventer that can be removed easily. This **MUST BE** removed before assembling to the engine.

The mechanical coupling is under the sole responsibility of the final user, and has to be done at his discretion.

Warnings:

**BEFORE STARTING THE ALTERNATOR, CHECK THAT THE AIR INLETS AND OUTLETS ARE FREE OF ANY OBSTRUCTIONS.**

THE AIR INLETS SHOULD NOT BE NEAR ANY HEATING SOURCES. IN ANY CASE, IF NOT SPECIFICALLY REQUESTED, THE COOLING AIR TEMPERATURE MUST BE EQUAL TO THE ENVIRONMENT TEMPERATURE AND NEVER HIGHER THAN 40°C.

**BEFORE MECHANICAL COUPLING OF SINGLE BEARING ALTERNATORS REMOVE THE ROTOR SECURING DEVICE PLACED THERE TO PREVENT ROTOR FROM SLIPPING DURING HANDLING.**

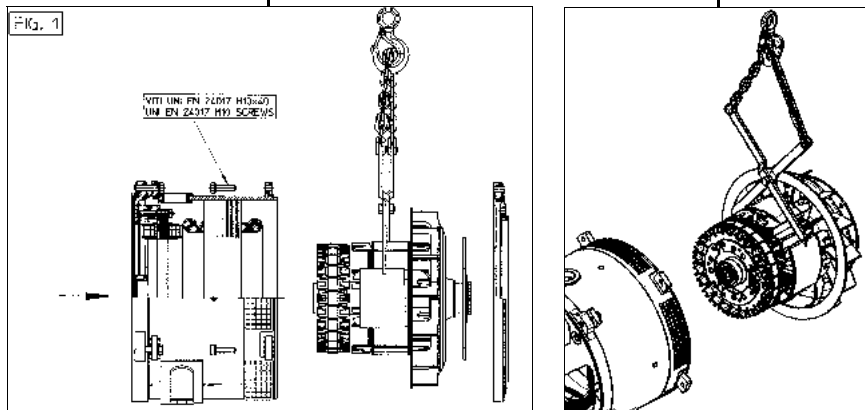
TRANSPORT ET STOCKAGE	TRANSPORT UND LAGERUNG	TRANSPORTE Y DEPOSITO
<p>Se rappeler qu'une fois l'alternateur accouplé au moteur d'entraînement, ou monté sur socle, ou installé sur un châssis de manière à former un seul bloc, il ne devra plus être soulevé par ses propres anneaux de levages mais il faudra suivre les indications de l'installateur.</p> <p>Ne pas jeter l'emballage dans la nature mais s'adresser à un centre de recyclage.</p>	<p>Sobald der Generator einmal an einen Antriebsmotor angeschlossen wird, bzw. auf einem Unterbau montiert oder in einem Rahmen installiert wird, so daß ein einziger Block entsteht, darf er nicht mehr an den Ringschrauben angehoben werden. Es sind die Vorschriften des Aggregate-Konstruktors zu beachten.</p> <p>Die Verpackung ist durch die entsprechen den Entsorgungsunternehmen zu entsorgen.</p>	<p>Recordar que, una vez que el generador será acoplado al motor primario, o montado en su base, o instalado en una estructura de manera de formar un cuerpo único, no deberá ser elevado por medio de sus ganchos, sino que se deberán seguir las indicaciones del instalador.</p> <p>No dejar que el embalaje se pierda en el ambiente, dirigirse siempre a cualquier agencia que trate el reciclaje de residuos.</p>
ACCOUPLLEMENT MECANIQUE	MECHANISCHER ANSCHLUß	ACOPLAMIENTO MECANICO
<p>Dans le but de protéger durant le transport et le stockage, la flasque d'accouplement ou l'extrémité de l'arbre, il est appliqué sur ces parties mécaniques un vernis anti-rouille détachable. <b>Ce vernis DOIT ETRE absolument ENLEVE avant l'assemblage final.</b></p> <p>L'accouplement de l'alternateur au moteur d'entraînement est à la charge de l'utilisateur final et est exécuté selon sa propre méthode.</p> <p>Les précautions requises sont :</p> <p>DANS LA MISE EN SERVICE, S'ASSURER QUE LES OUVERTURES D'ASPIRATIONS ET L'EVACUATION DE L'AIR DE REFROIDISSEMENT SOIENT TOUJOURS LIBRES.</p> <p>LE CÔTÉ DE L'ASPIRATION NE DOIT PAS ÊTRE PRÈS D'UNE SOURCE DE CHALEUR. DANS CHAQUE CAS, S'IL N'Y A PAS DE SPÉCIFICATION PARTICULIÈRE, LA TEMPÉRATURE DE L'AIR DE REFROIDISSEMENT DOIT ÊTRE CELLE AMBIANTE ET DE TOUTE FAÇON, NE DOIT PAS ÊTRE SUPÉRIEURE À 40°C.</p>	<p>Zum Transport und zur Lagerung sind die Anschlussflächen am Gehäuse und das Ende der Rotorwelle mit einem Rostschutzlack bestrichen, welcher leicht abziehbar ist. Dieser MUSS UNBEDINGT vor der Montage entfernt werden.</p> <p>Der Anschluß des Generators an einen Antriebsmotor obliegt dem Anwender und erfolgt nach eigenen Ermessen.</p> <p>Folgende Punkte sind zu beachten :</p> <p>BEI DER INBETRIEBNAHME IST ZU GEWÄHRLEISTEN, DAß DIE ÖFFNUNGEN FÜR DIE ANSAUGUNG BZW. FÜR DEN AUSTRITT DER KÜHLLUFT IMMER FREI BLEIBEN.</p> <p>DIE ANSAUGSEITE DARF SICH NICHT IN DER NÄHE VON WÄRMEQUELLEN BEFINDEN. FALLS NICHT ANDERWEITIG VEREINBART, MUß DIE KÜHLLUFT RAUMTEMPERATUR AUFWEISEN UND DARF DEN WERT VON 40°C NICHT ÜBERSCHREITEN.</p>	<p>Con el fin de proteger, durante el transporte, la brida de acople o la extremidad del eje a tales partes mecánicas se aplica un barniz antioxido que puede quitarse fácilmente. Dicha substancia debe absolutamente ser quitada antes del ensamble final.</p> <p>El acoplamiento del generador al motor primario es responsabilidad del usuario final, y el mismo será efectuado a propia discreción.</p> <p>Los puntos de atención requeridos son :</p> <p>EN LA PUESTA EN SERVICIO ASEGURARSE QUE LAS ABERTURAS DE ASPIRACION Y DESCARGA DEL AIRE DE REFRIGERACION SE ENCUENTREN SIEMPRE LIBRES DE OBSTACULOS.</p> <p>EL LADO DE ASPIRACION NO DEBE ESTAR CERCA A FUENTES DE CALOR. DE CUALQUIER MANERA, SI NO ES PREVIAMENTE CONVENIDO, LA TEMPERATURA DEL AIRE DE RIFERGERACION DEBE SER AQUELLA DEL AMBIENTE, DE TODOS MODOS NO SUPERIOR A 40 °C.</p>
<p><b>AVANT DE PROCÉDER À L'ACCOUPLLEMENT MÉCANIQUE DES GÉNÉRATEURS MONO-SUPPORT, ENLEVER LE SYSTÈME DE FIXAGE ROTOR, QUI EMPÊCHE CELUI-CI DE SE DÉBOÎTER PENDANT LE FONCTIONNEMENT.</b></p>	<p><b>BEVOR MAN MIT DER MECHANISCHEN KUPPLUNG DER EINLAGERGENERATOREN FORTFÄHRT, DAS ROTORENBESTÄTIGUNGSSYSTEM ENTFERNEN, DAS EBENSO DAS HERAUSZIEHEN WÄHREND DES INGANGETZENS VERHINDERT.</b></p>	<p><b>ANTES DE PROCEDER AL ACOPLAMIENTO MECÁNICO DE LOS GENERADORES CON SUPORTE UNICO , REMOVER EL SISTEMA FIJO DEL ROTOR EL CUAL IMPIDE QUE ESTE SE SUELTE DURANTE EL MOVIMIENTO.</b></p>

## ACCOPPIAMENTO MECCANICO

## MECHANICAL COUPLING

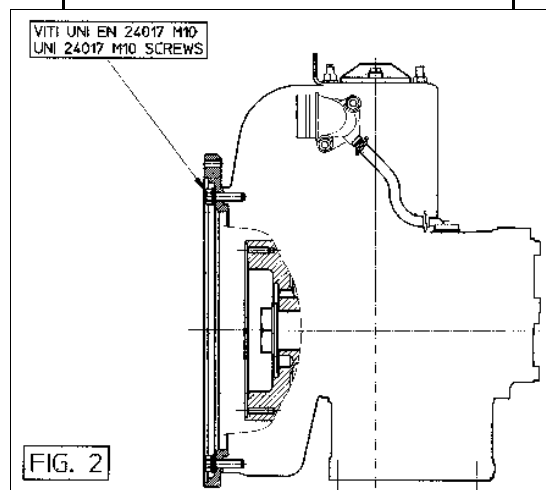
Togliere il coperchio dalla carcassa svitando le 4 viti M10x40mm.  
Sfilare il rotore facendo pressione nella parte posteriore dell'albero (fig. 1).

Remove the drive end bracket from the frame unscrewing the 4 screws M10x40 mm.  
Withdraw the rotor pushing on the rear part of the shaft (fig. 1).



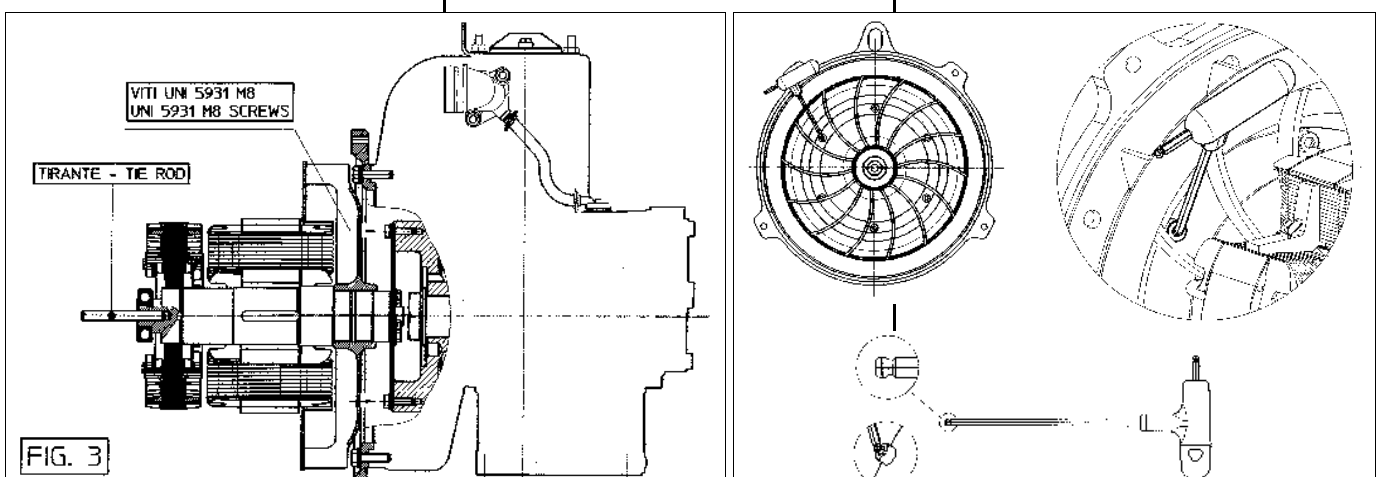
Fissare il coperchio anteriore alla flangia motore con viti M10 (coppia di serraggio 35 Nm) (fig. 2)

Fix the drive end bracket to the engine flange by M10 screws (tightening torque 35 Nm) (fig. 2).



Accostare la parte rotante della macchina al volano motore e facendo coincidere i fori dei dischi con quelli del volano, avvitare le parti con viti M8 (coppia di serraggio 21 Nm). Fissare un tirante M12 di lunghezza minima almeno di 80mm nella parte posteriore dell'albero (fig. 3).

Line up the rotating part of the machine with the engine flywheel, make sure the holes of the flywheel and those of the disks are aligned and then fix the parts by the M8 screws (tightening torque 21 Nm), fix a M12 tie rod 80mm long at least in the rear part of the shaft (fig. 3).



ACCOUPLLEMENT MECANIQUE	MECHANISCHER ANSCHLUß	ACOPLAMIENTO MECANICO
<p>Enlever le couvercle de la carcasse en dévissant les 4 vis M10x40mm. Déboîter le rotor en faisant pression dans la partie postérieure de l'arbre (fig. 1).</p>	<p>Den Deckel des Gerüsts abnehmen, indem man die 4 Schrauben M10x40 mm entfernt. Den Rotoren durch Druckmachen gegen die Hinterseite der Welle herausziehen. (Fig.1).</p>	<p>Quitar la tapa de la carcasa desatornillando los 4 tornillos tipo M10x40mm. Soltar el rotor haciendo presión en la parte posterior del árbol (fig. 1).</p>
<p>Fixer le couvercle antérieur sur la flaque moteur avec des vis M10 (couple de serrage 35 Nm) (fig. 2).</p>	<p>Den vorderen Deckel mit M 10 Schrauben an die Flansch befestigen (Anzugspaar 35 Nm) (Fig.2)</p>	<p>Fijar la tapa anterior a la arandela del motor con tornillos tipo M10, (copia de cerraje 35 Nm)(fig. 2)</p>
<p>Accoster la partie rotatoire de la machine au volant moteur et en faisant coïncider les trous des disques avec ceux du volant, visser les parties avec des vis M8 (couple de serrage 21 Nm). Fixer un tirant M12 d'une longueur minimum d'au moins 80 mm dans la partie postérieure de l'arbre (fig. 3).</p>	<p>Das rotierende Maschinenteil zum dem Motorsteuer rücken, sodass die Plattenlöcher mit denen des Steuers übereinstimmen, die Teile mit Schrauben M8 (Anzugspaar 21 Nm) anziehen. Eine Spannschraube M12 mit der Länge von mindestens 80 mm an die hintere Seite der Welle fixieren. (Fig.3)</p>	<p>Acostar la parte rotatoria de la máquina al rehilete del motor, haciendo coincidir los agujeros de los discos con los del rehilete, atornillar las partes con tornillos tipo M8 (copia de cerraje 21 Nm.) Fijar un tirante M12 con largo mínimo al menos de 80mm a la parte posterior del árbol ( fig. 3)</p>



## ACCOPPIAMENTO MECCANICO

Infilare la parte fissa della macchina sul rotore ed accostarla alla flangia sul motore.

Infilare una rondella sul tirante dell'albero (almeno  $\phi$  70 e foro centrale  $\phi$  12,5) e avvitare di seguito un dado M12 tenendo il piu' possibile la parte fissa in asse, facendo attenzione che sia la flangia che il cuscinetto entrino correttamente nella loro sede, avvitare il dado sul tirante finchè la carcassa andrà ad appoggiarsi al coperchio anteriore e il cuscinetto entrerà' totalmente nella propria sede.

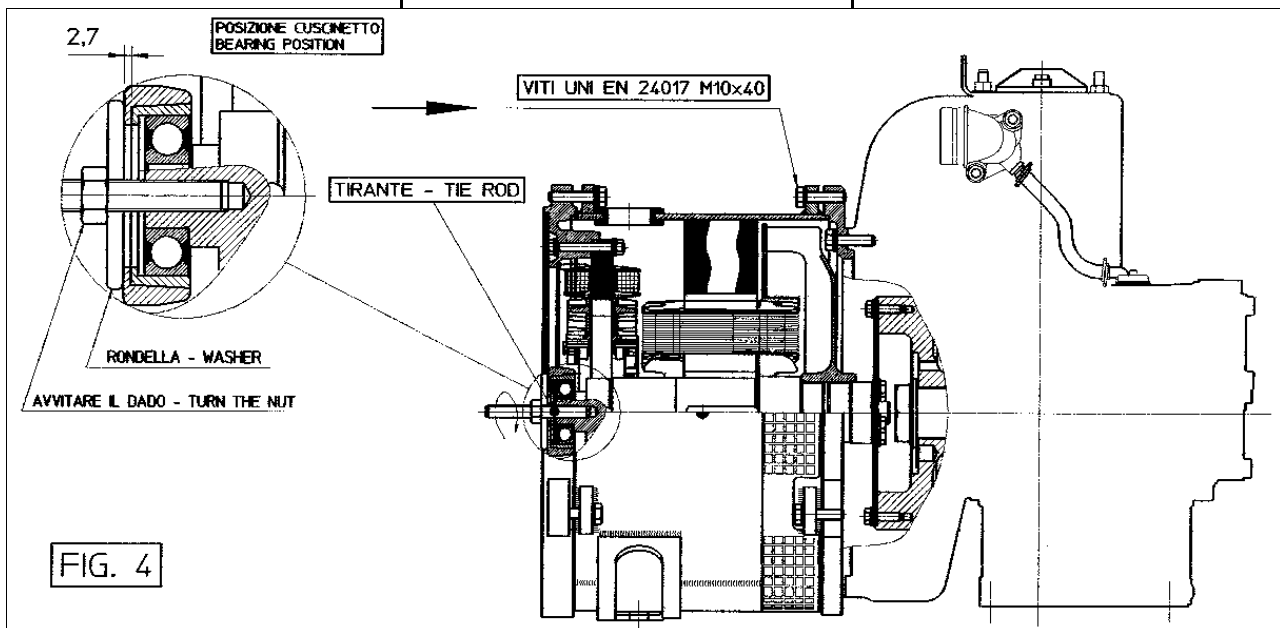
Fissare la carcassa al coperchio anteriore con n° 4 viti M10x40 (coppia di serraggio 35Nm) (fig. 4).

## MECHANICAL COUPLING

Insert the fixed part of the machine on the rotor and bring it near the drive end bracket.

Fit a washer on the rod of the shaft (washer on 70mm diameter at least and with a central hole of 12,5 mm), followed by a M12 nut, keeping the fixed part as much as possible aligned to the centre line and making sure that both the frame and the bearing are seated correctly, screw the nut on the tie rod until the frame fits into the drive end bracket and the bearing moves fully home.

Fix frame and drive end bracket together by 4 screws M10x40 (tightening torque 35 Nm) (fig. 4).

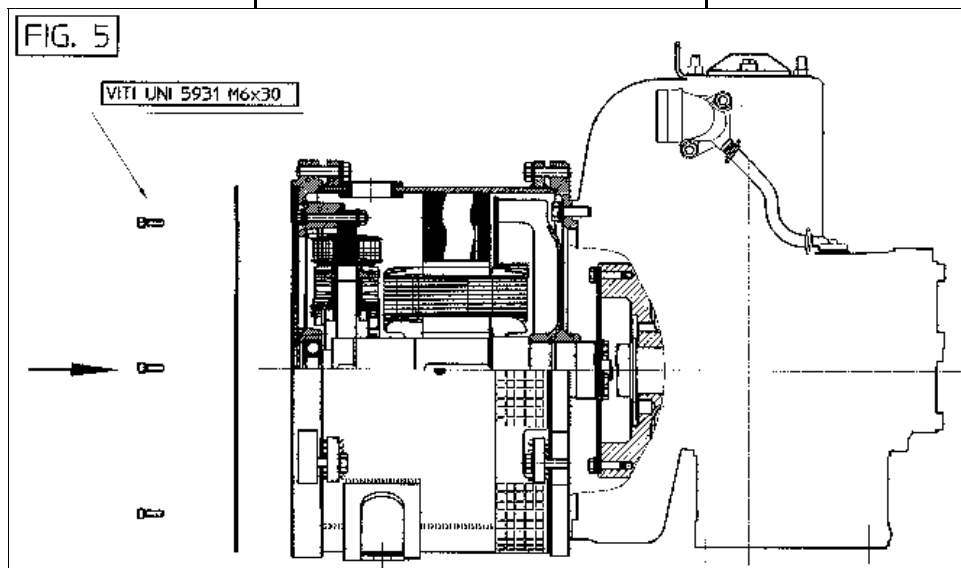


Togliere dado, rondella e tirante dall'albero.

Fissare la griglia posteriore con n° 4 viti M6x30 (fig. 5)

Remove the nut, the washer and the tie rod from the shaft.

Fix the rear seal by 4 screws M6x30mm (fig. 5).



ACCOUPLLEMENT MECANIQUE	MECHANISCHER ANSCHLUß	ACOPLAMIENTO MECANICO
<p>Enfiler la partie fixe de la machine dans le rotor et l'accoster à la flasque sur le moteur.</p> <p>Enfiler une rondelle sur le tirant de l'arbre ( au moins <math>\phi</math> 70 et trou central <math>\phi</math> 12,5) et visser ensuite un dé M12 en gardant le plus possible la partie fixe en axe; en faisant attention qu'aussi bien la flasque que le roulement entrent correctement dans leur logement, visser le dé sur le tirant jusqu'à ce que la carcasse s'appuie sur le couvercle antérieur et que le roulement s'insère complètement dans son logement.</p> <p>Fixer la carcasse au couvercle antérieur avec n° 4 vis M10x40 (couple de serrage 35Nm) (fig. 4).</p>	<p>Die Festseite der Maschine an den Rotoren reihen und an die Flansch auf dem Motor rücken.</p> <p>Eine Beilagscheibe über die Spannschraube der Welle ziehen (wenigstens <math>\phi</math> 70 und Zentralloch <math>\phi</math> 12.5) und nachher die Schraubenmütter M12 anziehen, indem man so gut als möglich die Festseite in der Achse hält und darauf acht gibt, dass die Flansche sowie das Lager genau in ihrem Platz hineingehen, die Mutter auf der Spannschraube anziehen bis das Gerüst sich an den Vorderdeckel lehnt und das Lager vollständig in seinem Platz einrastet. Das Gerüst an den Vorderdeckel mit 4 Schrauben M 10x40 (Anzugspaar 35m) montieren. (Fig.4)</p>	<p>Meter la parte fija de la máquina en el rotor y apoyarla a la arandela del motor. Meter una arandela sobre el tirante del árbol (almenos <math>\phi</math> 70 con agujero central <math>\phi</math> 12,5) y atornillar seguidamente un dado tipo M12 aguantando lo mas posible la parte fija en eje, teniendo cuidado que tanto como la arandela y el almohadín entren correctamente en su espacio, atornillar el dado sobre el tirante hasta que la carcasa se apoye por si sola a la tapa anterior y el almohadín entre totalmente en su propio espacio.</p> <p>Fijar la carcasa a la tapa anterior con n° 4 tornillos tipo M10x40 (copia de cerraje 35Nm) (fig.4)</p>
<p>Enlever le dé, la rondelle et le tirant de l'arbre.</p> <p>Fixer la grille postérieure avec n° 4 vis M6x30 (fig. 5)</p>	<p>Die Mutter, Beilagscheibe und Spannschraube abnehmen.</p> <p>Das Hintergitter mit 4 Schrauben M6x30 montieren. (Fig.5)</p>	<p>Quitar el dado, la arandela y el tirante del árbol.</p> <p>Fijar la parrilla posterior con n° 4 tornillos tipo M6x30 (fig. 5)</p>

**PERICOLO  
DANGER**



**GEFAHR  
PELIGRO**

L'accoppiamento elettrico e' a cura dell'utilizzatore finale ed e' eseguito secondo la sua sola discrezione.  
Per l'ingresso nella scatola morsetti si raccomanda di utilizzare passacavi e serracavi in accordo con le specifiche del paese di esportazione.

**COLLEGAMENTO AVVOLGIMENTI**  
Sono previsti entrambi i collegamenti, stella con neutro (Y) e triangolo (Δ) in tutti gli alternatori.

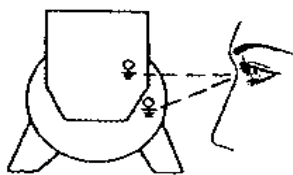
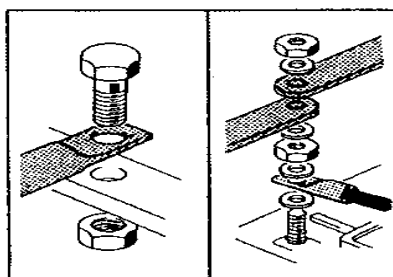
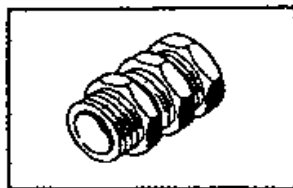
Per passare da un collegamento Y a Δ (es. da 400V a 230V) e' sufficiente spostare i ponti sulla morsettiera principale.

Nessun intervento e' richiesto sul regolatore di tensione.

I generatori sono costruiti di serie con 12 cavi di uscita per consentire di ottenere tensioni diverse (es. 115 / 200 / 230 / 400V).

I generatori, vanno sempre collegati a terra con un conduttore di adeguata sezione utilizzando uno dei due (interno/esterno) appositi morsetti.

Dopo aver eseguito il collegamento (per le coppie di serraggio vedere tabella 13 pag. 54) rimontare il coperchio scatola morsetti.



All electrical output connections are the responsibility of, and are at the discretion of, the end user.  
When making terminal box connections, all cable and terminal lugs should meet the relevant standards of the country of final destination.

**WINDINGS CONNECTION**  
All alternators feature both star with neutral (Y) and delta (Δ) connections.  
To reconnect from a star to delta connection (for ex. from 400V to 230V), modify the linking arrangements on the output terminal board. It is necessary to adjust the voltage regulator.

Standard alternators are equipped with 12 cables to offer different voltages (ex. 115/200/230/400V).

The alternator must always be earthed by sufficiently rated cable, using one of the inside or outside terminals.

After completing output connections (for tightening torque see tab. 13 pag. 54), ensure that the terminal box cover is securely in place.

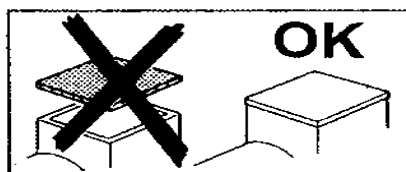
**IMPORTANTE:** variazioni di frequenza.  
La macchina fornita per funzionare a 50Hz puo' funzionare anche a 60Hz (o viceversa); e' sufficiente tarare il potenziometro al nuovo valore nominale di tensione.

Passando da 50 Hz a 60 Hz, la potenza puo' aumentare del 20% (corrente invariata), se la tensione aumenta del 20%; se la tensione rimane invariata la potenza, puo' aumentare del 5% per effetto della migliore ventilazione.

Per generatori costruiti appositamente per una frequenza di 60 Hz nel passaggio a 50 Hz, la tensione e la potenza devono necessariamente diminuire del 20% rispetto a quella riferita a 60Hz.

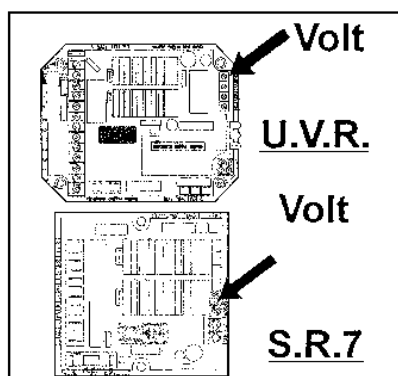
**REGOLATORI**  
I regolatori tipo U.V.R.6/1-F e S.R.7/2-G possono essere indifferentemente usati nella serie NPE senza modificare le prestazioni.

I due regolatori sono perfettamente uguali nelle prestazioni, ma si differenziano nelle segnalazioni e nel riferimento.



**IMPORTANT:** frequency variations.  
A standard production machine wound for 50 Hz can also function at 60 Hz (and vice versa) by resetting the A.V.R. voltage potentiometer to the new nominal voltage value. When changing from 50 to 60 Hz the alternator power, and nominal voltage will increase by 20%, but the current does not change from 50 Hz value. Should voltage stay at 50 Hz nominal value, then the output power may be increased by 5% due to improved ventilation.

For machines wound for 60 Hz, changing to 50 Hz, the voltage and power values have to decrease by 20% of 60 Hz value.



**REGULATORS**  
Either U.V.R.6/1-F and S.R.7/2-G regulators can be used on the NPE series without affecting performances.

The two regulators ensure the same level of performance but have different signal systems and references.

**PERICOLO  
DANGER****GEFAHR  
PELIGRO**

Le raccordement électrique est à la charge de l'utilisateur final et il est exécuté par ses soins. Pour le raccordement à la boîte à bornes, il est recommandé d'utiliser des passacables et des serre cables en accord avec les spécifications du pays d'exportation.

**COUPLAGE DES ENROULEMENTS**

Tous les alternateurs sont prévus pour être couplés soit en étoile avec neutre (Y) ou soit en triangle (Δ).

Pour passer de la connexion Y à Δ (par exemple de 400V à 230V) il est suffisant de modifier la position des barettes sur la planchette à bornes.

Aucune intervention n'est nécessaire sur le régulateur de tension.

Les alternateurs sont construits en série de 12 fils de sortie afin de permettre d'obtenir plusieurs possibilités de tensions (ex. 115 / 200 / 230 / 400V).

Les alternateurs doivent toujours être reliés à la terre avec un conducteur de section adéquate en utilisant une des deux (interne/externe) bornes appropriées.

Après avoir fait la liaison (pour la couple de serrage voir tab. 13 pag. 54), remonter le couvercle de la boîte à bornes.

**IMPORTANT:** variations de fréquence.

La macchina fornita per un funzionamento en 50 Hz peut également être entraînée pour 60 Hz (ou vice versa). Il est suffisant de tarer le potentiomètre "Volt" à la nouvelle valeur de tension. En passant de 50 Hz à 60 Hz, la puissance augmente de 20% (courant constant) si la tension augmente de 20%; par contre si la tension reste identique, la puissance est augmentée de 5% grâce à l'augmentation de la ventilation.

Pour les alternateurs produits à 60 Hz en passant à 50 Hz, la tension et la puissance doivent nécessairement diminuer de 20%.

**REGULATEURS**

Les régulateurs de type U.V.R.6/1-F et S.R.7/2-G peuvent être utilisés indifféremment dans la série NPE sans en modifier les prestations.

Les deux régulateurs sont parfaitement équivalents dans leurs performances, mais ce sont les signalisations et les informations qui les différencient.

Der elektrische Anschluß obliegt dem Endanwender und erfolgt nach eigenem Ermessen. Für den Eingang des Klemmenkastens wird empfohlen, Kabelführungen und Kabelschellen zu verwenden, die den Vorschriften und Spezifikationen des Exportlandes entsprechen.

**ANSCHLUß WICKLUNGEN**

Für alle Generatoren sind beide Anschlußarten vorgesehen: Stern mit Stempunktleiter (Y) und Dreieckschaltung (Δ).

Um von einer Y-Schaltung auf eine Δ-Schaltung zu wechseln, (z.B. von 400V auf 230V), ist es ausreichend, die Brücken auf der Hauptklemmleiste zu verschieben. Für den Spannungsregler ist keinerlei Eingriff erforderlich. Bei den Generatoren sind serienmäßig 12 Wicklungsenden auf das Hauptklemmbrett herausgeführt, so daß durch entsprechendes Umschalten 4 verschiedene Spannungen möglich sind (z.B. 115/200/230/400V). Die Generatoren müssen immer mit einem Leiter mit geeigneten Querschnitt unter Verwendung einer der dafür vorgesehenen Klemmen (innen / außen) geerdet werden.

Nach Durchführung des Anschlusses (für das Anzugsmoment siehe abb. 13 Seite 54) ist die Abdeckung des Klemmenkastens erneut anzubringen.

**WICHTIG:** Frequenzänderungen.

Ein für 50 Hz vorgesehener Generator kann durch entsprechende Drehzahländerung auch mit 60 Hz betrieben werden (oder umgekehrt). Dazu ist lediglich am Sollwertpotentiometer die mit der geänderten Drehzahl ebenfalls sich ändernde Spannung wieder auf die Nennspannung einzustellen. Beim Übergang von 50 auf 60 Hz darf die abgenommene Leistung um 20% erhöht werden. Beim Übergang von 60 auf 50 Hz müssen umgekehrt sowohl die Leistung als auch die Spannung wieder entsprechend reduziert werden.

**REGLER**

Die Regler, Typ U.V.R.6/1-F und S.R.7/2-G, können unterschiedslos in der Serie NPE ohne Leistungsänderung verwendet werden.

Die beiden Regler sind in ihrer Leistung absolut identisch und unterscheiden sich lediglich durch ihre Meldungen und Anschlüsse.

La conexión eléctrica es responsabilidad del usuario final y la misma se efectúa a discreción de este último. Para la entrada en la caja de bornes se recomienda utilizar pasa-cables con su sistema de fijación respectivo en conformidad con las especificaciones del país de exportación.

**CONEXIÓN BOBINADOS**

Se prevén ambas conexiones, estrella con neutro (Y) y triángulo (Δ) en todos los alternadores.

Para pasar de una conexión Y a Δ (ej. de 400V a 230V) es suficiente desplazar los puentes sobre los bornes principales.

Ningún tipo de intervención es requerido en el regulador de tensión.

Los generadores son construidos de serie con 12 cables de salida para permitir diferentes valores de tensión (ej. 115 / 200 / 230 / 400V).

Los generadores, deben ser siempre conectados a tierra con un conductor de sección adecuada, utilizando uno de los dos bornes (interno/externo) previstos para la misma.

Después de haber realizado la conexión (par de torque tab. 13 pag. 54), montar nuevamente la tapa de la caja de bornes.

**IMPORTANTE:** variación de frecuencia.

La máquina suministrada para funcionamiento a 50 Hz puede también funcionar a 60 Hz o viceversa. Para ello es suficiente tarar el potenciómetro al nuevo valor nominal de la tensión. Pasando de 50 a 60 Hz la potencia puede aumentar un 20% (corriente invariable) si la tensión aumenta un 20%. Si la tensión permanece invariable, la potencia puede aumentar un 5% por el efecto de una mejor ventilación. Para generadores construidos a 60 Hz, al pasar a 50 Hz, la tensión y la potencia deberán disminuir necesariamente un 20% con respecto a los valores de 60 Hz.

**REGULADORES**

Los reguladores del tipo U.V.R.6/1-F y S.R.7/2-G pueden ser indiferentemente utilizados en las series NPE sin modificar las características.

Los dos reguladores son perfectamente iguales en sus características, pero se diferencian en las señalizaciones y en la referencia de tensión.

## ACCOPIAMENTO ELETTRICO

### IMPORTANTE :

il controllo di tensione va eseguito a vuoto con l'alternatore funzionante a frequenza nominale.

Agendo sul potenziometro tensione dei regolatori elettronici si può ottenere la regolazione della tensione entro il  $\pm 5\%$  del valore nominale.

E' anche possibile, inserendo un potenziometro da  $100K\Omega$  negli appositi morsetti, ottenere la regolazione della tensione a distanza in un range di  $\pm 5\%$ .

### PROTEZIONI

#### U.V.R.6/1-F - S.R.7/2-G

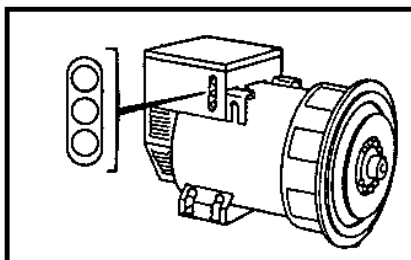
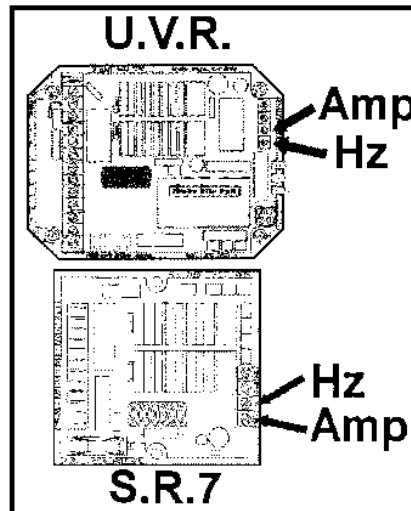
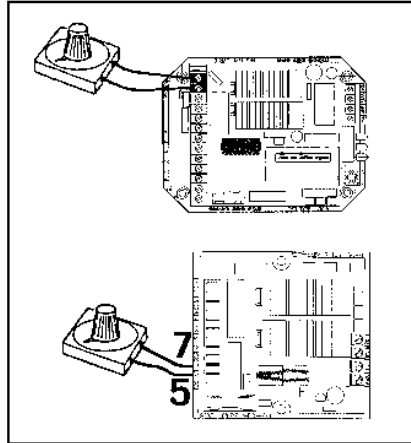
Entrambi i regolatori sono provvisti di una protezione di bassa velocità la cui soglia di intervento è regolabile tramite il potenziometro "Hz". L'intervento di tale protezione è istantaneo riducendo la tensione di macchina quando la frequenza scende sotto il 10% di quella nominale. I regolatori prevedono anche una seconda protezione (protezione di sovraccarico), che sente la tensione parzializzata che va al campo di statore dell'eccitatrice e se essa supera per più di 20 sec il valore stabilito, abbassa la tensione di macchina limitando la corrente di eccitazione entro valori di sicurezza.

Il ritardo appositamente inserito consente lo spunto del motore che normalmente si avvia in 5 - 10 sec. Anche la soglia di intervento di questa protezione è regolabile tramite il potenziometro "AMP".

#### U.V.R.6/1-F

Il regolatore U.V.R.6/1-F aggiunge alle prestazioni prima descritte, le seguenti caratteristiche:

- 1 - possibilità di avere il riferimento trifase oltre che monofase.
- 2 - segnalazioni a led di autodiagnostica che indicano le condizioni di funzionamento della macchina: un led verde, che normalmente acceso indica il funzionamento normale del generatore; un led rosso che indica l'intervento della protezione di bassa velocità, un led giallo che indica l'intervento della protezione di sovraccarico.



## ELECTRICAL CONNECTIONS

### IMPORTANT :

the generator output voltage must be checked under no-load conditions, with the correct setting of frequency.

The voltage may be adjusted by  $\pm 5\%$  of the nominal, by acting upon the voltage potentiometer on the electronic regulators.

By connecting a  $100 K\Omega$  potentiometer across the relevant terminals, it is possible to have a remote voltage regulation of  $\pm 5\%$  of nominal voltage.

### PROTECTIONS

#### U.V.R.6/1-F - S.R.7/2-G

Both regulators are provided with an under-speed protection with an intervention threshold which can be adjusted by the potentiometer marked "Hz". This protection intervenes instantaneously by reducing the alternator voltage to a safe value when frequency falls below 10% of the nominal value. These regulators also have inherent overload protection which senses the exciter field voltage value. Should this field voltage value exceed the nominal value for a period of more than 20 seconds, then again the alternator voltage is automatically reduced to a safe operating level. This overload function has a built-in delay to allow for the overload when starting motors (normally 5-10 seconds). The operating threshold of this protection device is adjustable by the potentiometer marked "AMP".

#### U.V.R.6/1-F

Aside from the above mentioned characteristics, the U.V.R.6/1-F regulator also offers the following:

- 1 - possibility to have single-phase as well as three-phase sensing
- 2 - led indicators for self-diagnosis which indicate the unit's operational conditions: a green led which when lit confirms the alternator's normal functioning; a red led indicates the under-speed protection is on; a yellow led indicates the overload protection is on.

## RACCORDEMENT ELECTRIQUE

### IMPORTANT :

le contrôle de la tension se fait à vide avec l'alternateur fonctionnant à la fréquence nominale.

En agissant sur le potentiomètre de tension du régulateur électronique, on peut obtenir la régulation de la tension entre + ou - 5% de la valeur nominale.

Il est aussi possible, en insérant un potentiomètre de 100 K $\Omega$  dans les bornes appropriées, d'obtenir le réglage de la tension à distance dans une plage de + ou -5%.

### PROTECTION

#### U.V.R.6/1-F - S.R.7/2-G

Les régulateurs sont pourvus d'une protection en sous-vitesse dont le seuil est réglable à travers le potentiomètre "Hz".

L'intervention de cette protection est instantanée en réduisant la tension de la machine et ce lorsque la fréquence descend de 10% au dessous de celle pré-réglée. Les régulateurs sont également pourvus d'une seconde protection (protection de surcharge) qui enregistre une partie de la tension d'alimentation du stator d'excitatrice. Si cette tension ne correspond pas à la valeur établie pour une durée supérieure à 20 secondes, la protection réduit la tension de la machine en limitant le courant d'excitation à sa valeur de sécurité. Le retard de 20 seconds autorise ainsi le démarrage des moteurs effectué normalement entre 5 et 10 secondes. Le seuil de cette protection est réglable avec le potentiomètre "Amp".

#### U.V.R.6/1-F

En plus des protections ci-dessus décrites, le régulateur U.V.R.6/1-F offre certaines autres caractéristiques:

- 1 - possibilité de connecter la référence en triphasé au lieu de monophasé
- 2 - signalisation à leds d'auto-diagnostic qui indique les conditions de fonctionnement de la machine: la led verte, allumée indique le fonctionnement correcte de l'alternateur; la led rouge indique une marche en sous-vitesse, et la led jaune montre l'intervention de la protection de surcharge.

## ELEKTRISCHER ANSCHLUSS

### WICHTIG :

Die Spannungskontrolle wird im Leerlauf bei Nennfrequenz durchgeführt.

Das Spannungspotentiometer der elektronischen Regler erlaubt die Spannungseinstellung. Diese Einstellung muß innerhalb  $\pm 5\%$  begrenzt sein.

Es ist ferner möglich, die geforderte Spannung mit einer Abweichung von  $\pm 5\%$  über Fernbedienung zu erzielen, und zwar durch Anschluß eines 100 K $\Omega$  Potentiometers an die entsprechenden Klemmen.

### SCHUTZEINRICHTUNGEN

#### U.V.R.6/1-F - S.R.7/2-G

Beide Regler schützen den Generator bei Unterdrehzahl. Der Ansprechwert wird am Potentiometer "Hz" eingestellt. Diese Schutzrichtung wirkt unverzögert, in dem die Ausgangsspannung des Generators reduziert wird, wenn die Nenndrehzahl um 10% unterschritten wird.

Beide Regler schützen den Generator auch bei Überlast, indem der Erregerstrom auf einen sicheren Wert begrenzt wird, sobald die Erregerspannung den zulässigen Wert länger als 20s. übersteigt. Diese Verzögerung erlaubt es, den kurzfristig erforderlichen erhöhten Anlaufstrombedarf von Drehstrom-Asynchronmotoren problemlos zu decken. Der Ansprechwert für den Überlastschutz ist am Potentiometer "AMP" ebenfalls einstellbar.

#### U.V.R.6/1-F

Der Regler U.V.R.6/1-F besitzt außer den vorgenannten Eigenschaften folgende zusätzliche Funktionen:

- 1 - Istwertfassung 3phasig anstelle 1phasig wie beim SR7
- 2 - Leuchtdiodenanzeigen für den Funktionszustand des Generators: eine grüne Leuchtdiode zeigt Normalbetrieb; eine rote Leuchtdiode zeigt Unterdrehzahl und eine gelbe Leuchtdiode zeigt Überlast an.

## CONEXION ELECTRICA

### IMPORTANTE :

El control de tensión se efectúa con el generador en vacío (sin carga) y a la frecuencia nominal.

Ajustando el potenciómetro tensión de los reguladores electrónicos se puede obtener la regulación de la misma dentro del  $\pm 5\%$  del valor nominal.

Es también posible, conectando un potenciómetro de 100 K $\Omega$  en los bornes respectivos, obtener una regulación de la tensión a distancia dentro de un rango del  $\pm 5\%$ .

### PROTECCIONES

#### U.V.R.6/1-F - S.R.7/2-G

En ambos reguladores está previsto una protección de baja velocidad, cuyo nivel de intervención es regulable a través del potenciómetro "Hz".

La actuación de dicha protección es instantánea, reduciendo la tensión de la máquina cuando la frecuencia desciende por debajo del 10% del valor nominal. Los reguladores proveen además una segunda protección (protección de sobrecarga), que controla la tensión parcial que va al campo del estator de la excitatriz, y que si ésta supera durante más de 20 segundos el valor establecido, reduce la tensión de la máquina limitando la corriente de excitación dentro de valores de seguridad. Este retardo realizado a propósito, permite el arranque de motores, que normalmente necesitan entre 5-10 segundos antes de alcanzar la condición de régimen. También en este caso el nivel de intervención de la protección es regulable mediante el potenciómetro "AMP".

#### U.V.R.6/1-F

El regulador U.V.R.6/1-F incorpora a las prestaciones anteriormente descritas, las siguientes características:

- 1 - posibilidad de tener referencia de tensión trifásica además de la monofásica
- 2 - señalación por medio de leds de autodiagnóstica que indican las condiciones de funcionamiento de la máquina: un led verde, normalmente encendido señala el funcionamiento normal del generador; un led rojo indica la intervención de la protección de baja velocidad, y finalmente un led amarillo que señala la intervención de la protección de sobrecarga.

## ACCOPIAMENTO ELETTRICO

### IMPORTANTE

Nel funzionamento normale del generatore deve essere acceso solamente il led verde.

Tutte queste segnalazioni possono essere remote a distanza e manipolate per usi diversi tramite l'utilizzo del dispositivo chiamato SPD 96/A, disponibile a richiesta.

### CAUSE CHE PROVOCANO L'INTERVENTO DELLE PROTEZIONI.

#### Intervento istantaneo protezione bassa velocità:

1 - velocità ridotta del 10% rispetto ai dati di targa.

#### Intervento ritardato protezione sovraccarico :

2 - sovraccarico del 20% rispetto ai dati di targa.

3 - fattore di potenza ( $\cos \varphi$ ) inferiore ai dati di targa.

4 - temperatura ambiente oltre i 50°C.

#### Intervento di entrambe le protezioni:

5 - combinazione del fattore 1 con i fattori 2, 3, 4.

Nel caso di intervento delle protezioni, la tensione erogata dall'alternatore scenderà fino ad un valore che dipenderà dall'entità dell'anomalia.

La tensione tornerà automaticamente al suo valore nominale qualora venga a cessare l'inconveniente.

Per maggiori dettagli sui regolatori consultare il manuale specifico.

Dopo aver eseguito tutti i collegamenti elettrici e solo dopo aver chiuso tutte le protezioni è possibile effettuare la prova di primo avviamento del sistema.



## ELECTRICAL CONNECTIONS

### IMPORTANT

In normal functioning, only the green led has to be lit.

All these indicators can be remotely controlled and adjusted, for any type of use, by utilizing the SPD 96/A accessory which is available on request.

### INTERVENTION OF PROTECTION DEVICES CAUSES.

#### Underspeed protection instantaneous intervention :

1 - speed reduced by 10% of nominal RPM

#### Delayed intervention of overload protection :

2 - overload by 20% of nominal rating.

3 - power factor ( $\cos \varphi$ ) lower than the nominal one.

4 - ambient temperature above 50°C.

#### Intervention of both protections :

5 - combination of factor 1 with factors 2, 3, 4.

In case of intervention the output voltage will drop down to a value which will depend on the fault.

The voltage will return automatically to its nominal value as soon as the fault is removed.

For further details on regulators, please see the specific manual.

After all the electric connections have been made and only after all the protections have been put in place, can the system be started.

## RACCORDEMENT ELECTRIQUE

### IMPORTANT

En fonctionnement correct seule la led verte doit être allumée.

Toutes ces protections peuvent être lues à distance, ou utilisées pour tous signaux, à travers notre SPD 96/A disponible sur demande.

### CAUSES QUI PROVOQUENT L'INTERVENTION DE LA PROTECTION.

#### Intervention instantanée de la protection sous-vitesse :

- 1 - vitesse réduite de 10% par rapport à celle affichée.

#### Intervention retardée de la protection surcharge :

- 2 - surcharge de 20% par rapport à la plaque.
- 3 - facteur de puissance ( $\cos \varphi$ ) inférieur à la plaque.
- 4 - température ambiante supérieure à 50°C.

#### Intervention de toutes les protections :

- 5 - combinaison des facteurs 1 avec 2, 3 et 4.

Dans ce cas la tension de la machine diminuera jusqu'à une valeur qui dépendra de l'entité de l'anomalie.

La tension reviendra automatiquement à sa valeur nominale lorsque cessera la cause du problème.

Pour plus de détails sur les régulateurs, consulter le manuel spécifique.

Après avoir exécuté tous les raccordements électriques et seulement après avoir contrôlé le fonctionnement de toutes les protections, il est possible d'effectuer l'essai de la première mise en marche du système.

## ELEKTRISCHER ANSCHLUSS

### WICHTIG

Bei Normalbetrieb muß ausschliesslich die grüne Leuchtdiode leuchten.

Die genannten Anzeigen sind für den Fernübertragung vorgesehen und können auf dem Zusatzgerät Typ SPD 96/A (lieferbar auf besondere Bestellung) sichtbar gemacht werden.

### STÖRUNGEN, DIE ZUM AUSLÖSEN DER SCHUTZEINRICHTUNGEN FÜHREN.

#### Unverzögertes Ansprechen des Unterdrehzahlschutzes :

- 1 - Auslösung bei 10% unter Nenndrehzahl gemäß Typenschild.

#### Verzögertes Ansprechen des Überlastschutzes, Auslösung bei :

- 2 - 20% Überlast im Vergleich mit Angaben auf dem Typenschild.
- 3 - Leistungsfaktor  $\cos \varphi$  kleiner als Nennleistungsfaktor gemäß Typenschild.
- 4 - Umgebungstemperatur größer 50°C.

#### Ansprechen beider Schutzeinrichtungen :

- 5 - Kombination der Ursache 1 mit 2, 3 und 4.

Sofort Unterfrequenz und eine oder mehrere Ursachen für das Ansprechen des Überlastschutzes auftreten, wird die Erregerspannung auf einen Wert zurückgeregelt, der vom Ausmaß der Fehlerursachen abhängt. Sobald die Störung beseitigt ist, kehrt die Spannung auf den Nennwert zurück.

Für weitere Einzelheiten bezüglich der Regler, schlagen Sie bitte in dem entsprechenden Handbuch nach.

Nachdem alle elektrischen Anschlüsse angeführt und nur nachdem alle Schutzvorrichtungen geschlossen wurden, ist es möglich, die Prüfung eines ersten Systemstarts durchzuführen.

## CONEXION ELECTRICA

### IMPORTANTE

En el funcionamiento normal del generador, deberá encenderse solo el led verde. Todas estas señalizaciones se pueden llevar a distancia, y ser manipuladas en diversas aplicaciones por medio del dispositivo llamado SPD 96/A, disponible a pedido.

### CAUSAS QUE PRODUCEN LA INTERVENCION DE LAS PROTECCIONES.

#### Intervención instantánea, protección baja velocidad :

- 1 - velocidad reducida del 10% con relación a los datos de tarjeta.

#### Intervención retardada, protección de sobrecarga :

- 2 - sobrecarga del 20% respecto a los datos de tarjeta.
- 3 - factor de potencia ( $\cos \varphi$ ) inferior a los datos de tarjeta.
- 4 - temperatura ambiente superior 50°C.

#### Intervención de ambas protecciones :

- 5 - combinación del factor 1 con los factores 2, 3, 4.

En el caso de intervención, la tensión suministrada por el alternador descenderá hasta un valor que dependerá de la entidad del problema.

La tensión volverá automáticamente a su valor nominal en el momento cese el inconveniente.

Para mayor información sobre los reguladores, consultar el manual específico.

Después de haber realizado todas las conexiones eléctricas y "solo después de haber cerrado todas las protecciones" es posible efectuar el primer arranque del sistema.



## AVVIAMENTO E ARRESTO

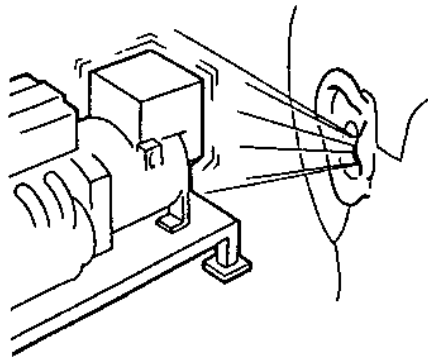
La strumentazione per l'avviamento, la conduzione e l'arresto del sistema e' a carico dell'installatore.

**LE OPERAZIONI DI AVVIAMENTO, CONDUZIONE E ARRESTO DEVONO ESSERE ESEGUITE DA PERSONALE ADEGUATAMENTE QUALIFICATO E CHE ABBAIA LETTO E COMPRESO LE PRESCRIZIONI DI SICUREZZA ALL'INIZIO DEL MANUALE.**

**IMPORTANTE :**

Durante il primo avviamento, che deve essere eseguito a velocita' ridotta, l'installatore dovra' verificare che non si presentino rumori anomali.

In caso di rumori anomali provvedere a fermare immediatamente il sistema e intervenire per migliorare l'accoppiamento meccanico.



## STARTING AND STOPPING OPERATIONS

All the instrumentation for starting, running and stopping the system shall be provided by the installer.

**THE STARTING, RUNNING AND STOPPING OPERATIONS MUST BE CARRIED OUT BY SKILLED PERSONNEL WHO HAVE READ AND UNDER-STOOD THE SAFETY INSTRUCTIONS AT THE BEGINNING OF THIS MANUAL.**

**IMPORTANT :**

When the system is set to work for the first time, which has to be done at a reduced speed, the operator shall check that no anomalous noises can be detected.

If an anomalous noise is detected, stop the system immediately and improve the mechanical coupling.

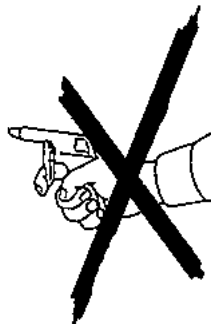
## PULIZIA E LUBRIFICAZIONE

Prima di avvicinarsi al generatore assicurarsi che sia a stato energetico zero e a temperatura ambiente; a questo punto e' possibile pulirlo esternamente con aria compressa.

**NON UTILIZZARE MAI LIQUIDI O ACQUA.**

**NON PULIRE CON ARIA COMPRESSA LE PARTI ELETTRICHE INTERNE, POICHE' POSSONO VERIFICARSI CORTOCIRCUITI O ALTRE ANOMALIE.**

Per la lubrificazione dei cuscinetti consultare la tabella 12 pag. 54.



## CLEANING AND LUBRICATION

Prior to approaching or touching the alternator, ensure that it is not live and it is at room temperature; at this stage it is possible to clean it on the outside using compressed air.

**NEVER USE LIQUIDS OR WATER.**

**DO NOT CLEAN THE INSIDE ELECTRIC COMPONENTS WITH COMPRESSED AIR, BECAUSE THIS MAY CAUSE SHORT-CIRCUITS OR OTHER ANOMALIES.**

For the lubrication of bearings, see table 12 on page 54.

## MANUTENZIONE

## MAINTENANCE

**PERICOLO  
DANGER**



**GEFAHR  
PELIGRO**






I generatori della serie NPE sono costruiti per lavorare a lungo senza manutenzione.

**PRIMA DI ESEGUIRE QUESTA OPERAZIONE LEGGERE MOLTO ATTENTAMENTE LE PRESCRIZIONI DI SICUREZZA ALL'INIZIO DI QUESTO MANUALE.**

The alternators series NPE are designed to give a long maintenance free working life.

**BEFORE PERFORMING THIS OPERATION, READ THE SAFETY REQUIREMENTS AT THE BEGINNING OF THIS MANUAL CAREFULLY.**

DEMARRAGE ET ARRET	ANTRIEB UND STILLSETZUG	ARRANQUE Y PARADA
<p>La manipulation pour le démarrage, le fonctionnement et l'arrêt est à la charge de l'installateur.</p> <p><b>LES OPERATIONS DE DEMARRAGE, FONCTIONNEMENT ET ARRET DOIVENT ETRE FAITES PAR DU PERSONNEL QUALIFIE AYANT LU ET COMPRIS LES PRESCRIPTIONS DE SECURITE AU DEBUT DU MANUEL.</b></p> <p><b>IMPORTANT :</b> Durant le premier démarrage, qui doit être exécuté à vitesse réduite, l'installateur doit vérifier qu'aucun bruit anormal ne se présente. Dans le cas de bruits anormaux, interrompre immédiatement le fonctionnement et vérifier l'accouplement mécanique.</p>	<p>Die Instrumentierung für Antrieb, die Netzführung und die Stillsetzung der Systeme obliegt dem Monteur.</p> <p><b>ANTRIEB, NETZFÜHRUNG UND STILLSETZUNG DÜRFEN AUSSCHLIEßLICH VON ENTSPRECHEND QUALIFIZIERTEN FACHPERSONAL DURCHGEFÜHRT WERDEN UND ZWAR ERST NACHDEM DIE SICHERHEITSVORSCHRIFTEN AM ANFANG DIESES HANDBUCHS GELESEN UND VERSTANDEN WORDEN SIND.</b></p> <p><b>WICHTIG :</b> Während der ersten Inbetriebnahme, die mit reduzierter Geschwindigkeit erfolgen muß, hat der Monteur zu überprüfen, ob Anomalien in der Geräuscentwicklung auftreten. Im Falle von Anomalien in der Geräuscentwicklung, ist dafür zu sorgen, daß die Anlage unverzüglich gestoppt wird. Die mechanischen Anschlüsse müssen in diesem Falle verbessert werden.</p>	<p>La instrumentación para el arranque, la conducción y la parada del sistema es a cargo del instalador.</p> <p><b>LAS OPERACIONES DE ARRANQUE, CONDUCCION Y PARADA DEBEN SER REALIZADAS POR PARTE DE PERSONAL ADECUADAMENTE CALIFICADO Y QUE HAYA LEIDO Y COMPRENDIDO LAS NORMAS DE SEGURIDAD AL PRINCIPIO DEL MANUAL.</b></p> <p><b>IMPORTANTE :</b> Durante el primer arranque, que deberá efectuarse a baja velocidad, el instalador deberá controlar que no se presenten ruidos anormales. En caso de ruidos anormales, detener inmediatamente el sistema e intervenir para mejorar el acoplamiento mecánico.</p>
<p><b>NETTOYAGE ET GRAISSAGE</b></p>	<p><b>REINIGUNG UND SCHMIERUNG</b></p>	<p><b>LIMPIEZA Y LUBRIFICACION</b></p>
<p>Avant tout contact avec l'alternateur, s'assurer de sa propreté parfaite et qu'il soit à température ambiante; il est alors possible de le nettoyer extérieurement avec de l'air comprimé.</p> <p><b>NE JAMAIS UTILISER DE LIQUIDE OU DE L'EAU.</b></p> <p><b>NE PAS NETTOYER AVEC DE L'AIR COMPRIME LES PARTIES ELECTRIQUES INTERNES, CAR L'ON POURRAIT PROVOQUER UN COURT-CIRCUIT OU AUTRES ANOMALIES.</b></p> <p>Pour le graissage des roulements, consulter le tableau 12 pag. 54.</p>	<p>Bevor Sie sich dem Generator nähern, ist sicherzustellen, daß dieser nicht mehr stromführend ist und sich auf Raumtemperatur abgekühlt hat; zu diesem Zeitpunkt ist es möglich, den Generator von außen mit Preßluft zu reinigen.</p> <p><b>NIEMALS FLÜSSIGREINIGER ODER WASSER VERWENDEN.</b></p> <p><b>DIE INNENLIEGENDEN ELEKTROTEILE NIEMALS MIT PRESSLUFT REINIGEN, DA SICH KURZSCHLÜSSE ODER ANDERE STÖRUNGEN DARAUS ERGEBEN KÖNNTEN.</b></p> <p>Bezüglich der Schmierung der Lager sind die Angaben in Tabelle 12, Seite 54 zu befolgen.</p>	<p>Antes de acercarse al generador, asegurarse que el mismo sea a estado energético cero y a temperatura ambiente; en estas condiciones es posible limpiarlo externamente con aire comprimido.</p> <p><b>NO UTILIZAR NUNCA LIQUIDOS O AGUA.</b></p> <p><b>NO LIMPIAR CON AIRE COMPRIMIDO LAS PARTES ELECTRICAS INTERNAS, DEBIDO A LA POSIBILIDAD DE CAUZAR CORTOCIRCUITOS O CUALQUIER OTRO TIPO DE PROBLEMA.</b></p> <p>Para la lubricación de los cojinetes consultar la tabla 12 pag. 54.</p>
<p><b>MAINTENANCE</b></p>	<p><b>WARTUNG</b></p>	<p><b>MANTENIMIENTO</b></p>

<p><b>PERICOLO DANGER</b></p> 	  	<p><b>GEFAHR PELIGRO</b></p> 
<p>Les alternateurs de la série NPE sont construits pour fonctionner longtemps sans aucun entretien.</p> <p><b>AVANT D'EXECUTER CETTE OPERATION, LIRE ATTENTIVEMENT LES PRESCRIPTIONS DE SECURITE AU DEBUT DU MANUEL.</b></p>	<p>Die Generatoren der Serie NPE sind so konstruiert, daß sie einen langen Zeitraum ohne Wartung arbeiten können.</p> <p><b>BEVOR DIESE ARBEITEN DURCHGEFÜHRT WERDEN, SIND DIE AM ANFANG DIESER HANDBUCHES ANGEgebenEN SICHERHEITSVORSCHRIFTEN AUFMERKSAM ZU LESEN.</b></p>	<p>Los generadores de las series NPE son construidos para trabajar por mucho tiempo sin mantenimiento.</p> <p><b>ANTES DE REALIZAR DICHA OPERACION LEER CUIDADOSAMENTE LAS NORMAS DE SEGURIDAD AL PRINCIPIO DE ESTE MANUAL.</b></p>

## MANUTENZIONE

Gli interventi di manutenzione sul generatore Mecc Alte si possono dividere in ordinari e straordinari; in ogni caso qualsiasi intervento deve essere autorizzato dal responsabile della sicurezza, a macchina ferma e isolata elettricamente dall'impianto o dalla rete.

La manutenzione e la ricerca guasti deve essere eseguita da personale elettricamente/meccanicamente qualificato in quanto ogni operazione a seguito descritta presenta pericoli per il personale. Si raccomanda inoltre che siano prese tutte le precauzioni per impedire che la macchina venga riavviata inavvertitamente durante le fasi di manutenzione e ricerca guasti.

Gli interventi di manutenzione ordinaria possono essere riassunti in :

- a) verifiche condizioni avvolgimenti dopo lunghi periodi di immagazzinamento o di sosta
- b) verifiche, ad intervalli regolari, del corretto funzionamento (assenza di rumori o vibrazioni anomale)
- c) verifiche meccaniche su tutti i bulloni di fissaggio ed in particolare delle connessioni elettriche
- d) pulizia esterna del generatore

### a) Verifiche condizioni avvolgimenti dopo lunghi periodi di immagazzinamento o di sosta.

La condizione degli avvolgimenti può essere verificata mediante la misura della resistenza di isolamento verso terra. Tale misura si esegue con uno strumento "Megger" o similari a 500V di tensione continua; è importante che prima di eseguire la prova, il regolatore di tensione (fig. a), il ponte diodi rotante (fig. b), i filtri anti disturbi radio (fig. c) e tutti gli eventuali dispositivi connessi elettricamente agli avvolgimenti da verificare, vengano scollegati.

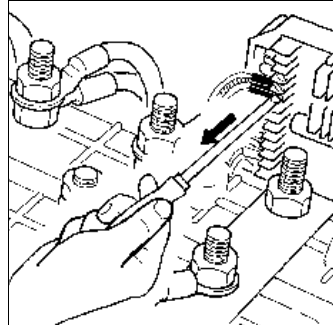
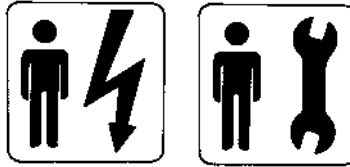


fig. a

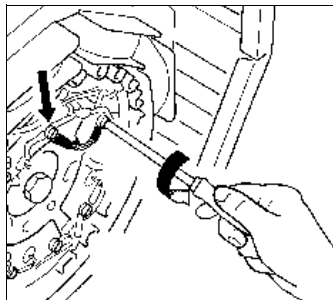


fig. b

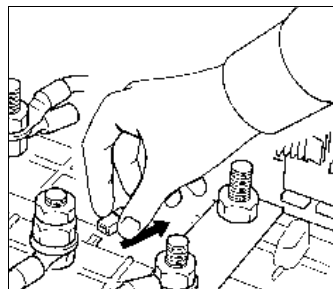


fig. c

## MAINTENANCE

Maintenance operations on Mecc Alte generators can be divided into routine and extraordinary maintenance operations; in both cases, all operations must be authorised by the safety representative and they must be carried out when the machine is turned off and insulated from the electric installation or from the power mains.

High-qualified mechanical or electrical technicians must carry out maintenance operations and any fault search since all operations described hereunder could put personnel in serious danger.

It is also highly recommended to take all the necessary precautions so as to prevent an inadvertent starting of the machine during maintenance and fault search operations.

Routine maintenance operations can be summed up as follows:

- a) Assessment of windings conditions after long periods of storage or inactivity
- b) Assessment, on a regular basis, of correct functioning (absence of anomalous noises or vibrations)
- c) Mechanical inspections on all fastening bolts and, in particular, on electric connections
- d) external cleaning of generator

### a) Assessment of windings conditions after long periods of storage or inactivity.

Measuring the insulating earth resistance can assess the condition of the windings. This measurement can be carried out with a "Megger" device, or similar, with a 500V direct-current voltage. It is very important to disconnect the voltage regulator (fig. a), the rotating diode bridge (fig. b) and the radio-interference filter (fig. c), as well as any other device connected to the windings to be checked, before carrying out the measurement.

MAINTENANCE	WARTUNG	MANTENIMIENTO
<p>Les interventions de maintenances sur les alternateurs Mecc Alte peuvent être considérées comme ordinaires ou extra-ordinaires ; dans chaque cas toute intervention doit être autorisée par le responsable de la sécurité, et effectuée sur une machine arrêtée et isolée électriquement de l'installation ou du réseau.</p> <p>La maintenance et le recherche de panne doit être effectuée par du personnel électriquement/mécaniquement qualifié car chaque opération décrite ci-dessous présente des dangers pour l'utilisateur.</p> <p>Nous recommandons en outre que soient prises toutes les précautions pour empêcher le redémarrage du groupe par inadvertance durant les phases de maintenances et de recherche de pannes.</p>	<p>Die Wartungsarbeiten an dem Stromerzeuger Mecc Alte Spa können in normale und ausserordentliche geteilt werden; auf jeden Fall muss jede Wartung von dem Sicherheitsverantwortlichen autorisiert werden ; das kann nur passieren wenn die Maschine unbeweglich und elektrisch von der Anlage oder von dem Netz isoliert wird.</p> <p>Die Wartung und die Schadenuntersuchung muss von den elektrischen/mechanischen Fachkräften getan werden,denn jede Operation, welche unten beschrieben wird, zeigt besondere Gefahren für das Dienstpersonal.</p> <p>Es wird streng empfohlen, alle Vorsichtsmassnahmen zu treffen, um zu verhindern,dass die Maschine versehentlich während der Wartung und der Schadenuntersuchung wieder angelassen wird.</p>	<p>Las intervenciones de manutención en el generador Mecc Alte se pueden dividir en ordinarias y extraordinarias; de cualquier forma, todas las intervenciones deben ser autorizadas por el responsable de la seguridad, con la máquina parada y aislada electricamente de la instalación o de la red.</p> <p>La manutención y la búsqueda de averías deben ser hechas por personal electricamente/mecánicamente cualificado, ya que cada operación a seguir descrita presenta peligros para el personal.</p> <p>Se recomienda además que sean tomadas todas las precauciones para impedir que la máquina vuelva a funcionar inadvertidamente durante las fases de manutención y búsqueda de averías.</p>
<p>Les interventions de maintenances ordinaires peuvent être résumées ainsi :</p> <p>a) Vérification des enroulements après de longues périodes d'emmagasinement ou d'arrêt de fonctionnement.</p> <p>b) Vérification, à intervalles réguliers, du fonctionnement correct (absence de bruit ou vibrations anormales).</p> <p>c) Vérifications mécaniques de tous les boulons de fixations et en particulier des connexions électriques.</p> <p>d) Nettoyage externe de l'alternateur.</p>	<p>Die normalen Wartungsarbeiten können wie folgt zusammengefasst werden.</p> <p>a) Nachprüfungen der Wicklungswiderstände nach längeren Zeiten von Einlagerung oder Stillstand</p> <p>b) Nachprüfungen in regelmässigen Zeitabständen, der richtigen Arbeitsweise (Abwesenheit von Laermen oder anomalen Vibrationen)</p> <p>c) Mechanische Nachprüfungen über alle Befestigungsbolzen und besonderes über die elektrischen Verbindungen.</p> <p>d) Innerliche Reinigung des Stromerzeugers</p>	<p>Las intervenciones de manutención ordinaria pueden ser resumidas en:</p> <p>a) verificaciones de condiciones de envoltura después de largos periodos de almacenaje o de pausa</p> <p>b) verificaciones, a intervalos regulares, del correcto funcionamiento (ausencia de ruidos o vibraciones anómalas)</p> <p>c) verificaciones mecánicas en todos los pernos de fijación y en particular de las conexiones eléctricas</p> <p>d) limpieza externa del generador</p>
<p><b>a) Vérification des enroulements après de longues périodes d'emmagasinement ou d'arrêt de fonctionnement :</b></p> <p>L'état des enroulements peut être vérifier par la mesure de la résistance de l'isolement vers la masse ou terre. Telle mesure s'effectue par un instrument "Megger" ou un matériel similaire à 500 V de tension en continue. Il est important que, avant d'effectuer l'essai, le régulateur de tension (fig. a), le pont de diodes tournantes (fig. b), les filtres anti-parasitage ( fig. c) et tous les éventuels dispositifs de connexions électriques aux enroulements à vérifier, ne soient pas connectés.</p>	<p><b>a) Nachprüfungen der Wickelkbedingungen nach längeren Zeiten von Einlagern oder Stillstand.</b></p> <p>Die Wickelbediengungen können durch die Messung des Erdeisolierungswiderstands überprüft werden.</p> <p>Diese Messung wird durch ein Instrument genannt Megger oder durch einige ähnliche Instrumente mit 500 V Prüfspannung ausgeführt; es ist ganz wichtig dass, bevor die Probe getan wird, der Spannungsregler (abb. a), die rolende Diodebrücke (abb. b), die Funkentstör-Filter (abb. c) und alle andere eventuelle Vorrichtungen,welche mit den überprüfenden Wicklungen elektrisch verbunden sind, ausgeschaltet werden.</p>	<p><b>a) Verificación de condiciones de envoltura después de largos periodos de almacenaje o de pausa.</b></p> <p>La condición de las envolturas puede ser verificada por la medición de la resistencia de aislamiento a la tierra. Tal medición se lleva a cabo con un instrumento "Megger" o similares a 500V de tensión continua; es importante que antes de hacer la prueba, el regulador de tensión (fig. a), el puente diodos rotativo (fig. b), los filtros anti-disturbio radio (fig. c) y todos los eventuales dispositivos conectados electricamente a las envolturas verificadas, sean desconectados.</p>

## MANUTENZIONE

Il valore misurato di resistenza verso terra di tutti gli avvolgimenti deve essere superiore a  $1M\Omega$ .

Nell'ipotesi in cui il valore misurato sia inferiore a quanto sopra riportato, gli avvolgimenti devono essere opportunamente asciugati. Tale operazione può essere eseguita indirizzando un getto di aria calda a circa  $50-60^{\circ}\text{C}$ , negli ingressi o nelle uscite dell'aria del generatore.

In alternativa a quanto sopra, gli avvolgimenti di statore possono essere collegati elettricamente e fatti attraversare da una corrente mediante un alimentatore in continua; il valore di corrente da fare circolare negli avvolgimenti dipenderà dalle dimensioni dell'alternatore e comunque dovrà essere stabilito in accordo ai valori nominali riportati nella targhetta.

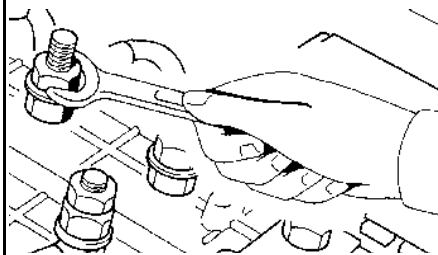
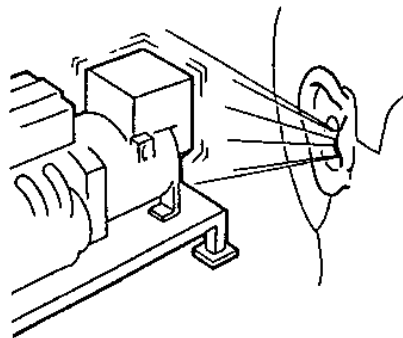
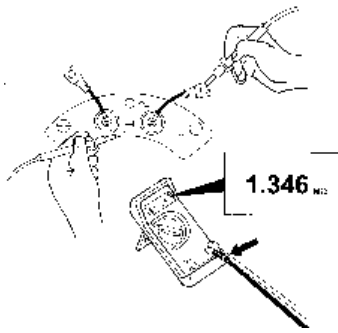
### b) Verifiche del corretto funzionamento (assenza di rumori o vibrazioni anomale).

Ad intervalli regolari raccomandiamo di verificare che il generatore funzioni regolarmente senza rumori o vibrazioni anomale; tali presenze potrebbero denotare il danneggiamento dei cuscinetti. Ricordiamo che l'alternatore a sé stante non presenta vibrazioni particolari in quanto le parti rotanti sono perfettamente bilanciate. Premesso che la bilanciatura del rotore non sia stata alterata e che i cuscinetti dell'alternatore non siano danneggiati, le cause delle vibrazioni presenti sul gruppo elettrogeno saranno da ricercare negli allineamenti degli accoppiamenti, nelle sollecitazioni del motore termico o nei supporti antivibranti.

Si raccomanda inoltre di verificare i dati funzionali che devono risultare in linea con quanto riportato nella targhetta del generatore.

### c) Verifiche meccaniche su tutti i bulloni di fissaggio ed in particolare delle connessioni elettriche.

Ad intervalli regolari raccomandiamo di verificare che tutti i bulloni di fissaggio siano adeguatamente stretti; una particolare attenzione deve essere rivolta alle connessioni elettriche, operazione che deve essere eseguita con la assoluta certezza di assenza di tensione. Nel manuale del generatore sono indicate le corrette coppie di serraggio delle varie dimensioni di bullone.



## MAINTENANCE

The figure resulting from the measurement of the windings' earth resistance must be over  $1M\Omega$ .

Should the figure be smaller than the above-mentioned one, the windings must be adequately dried up. This can be done by directing a jet of hot air of about  $50-60^{\circ}\text{C}$  into the generator's air inlets or outlets; alternatively, the stator's windings can be electrically connected and a voltage can be passed through them by means of a direct-current power supply. The amount of current in the windings depends on the generator size, even though it must be fixed according to the nominal values stated on the plate.

### b) Assessment of current functioning (absence of anomalous noises or vibrations).

We recommend users to check regularly the correct functioning of the generator, and to verify that there are no anomalous noises or vibrations; their presence might indicate damage of bearings.

May we remind you that the alternator itself has no particular vibration since the rotating parts are perfectly balanced. Provided that the rotor balancing has not been altered and that the rotor's bearings have not been damaged, vibrations in the generator set may occur due to alignments of couplings, due to stress upon the combustion engine, or to vibration mounts.

We also recommend checking of performance data which must comply with the data on the generator's plate.

### c) Mechanical checks of fastening bolts and, in particular, of electric connections.

We recommend a regular check of all fastening bolts, which must be perfectly tightened up. Special attention should be paid to all electric connections; this inspection must be carried out in the complete absence of voltage. To choose the correct tightening wrenches suitable for the different sizes of the bolts, see generator manual.

## MAINTENANCE

La valeur mesurée de la résistance vers la terre de tous les enroulements doit être supérieure à 1 Mohm.

Dans l'hypothèse dans laquelle la valeur mesurée soit inférieure à ce qui était ci-dessus donné, les enroulements doivent être opportunément sèches.

Telle opération peut être exécutée en dirigeant un jet d'air chaud à environ 50-60° c dans les entrées ou sorties d'air de l'alternateur.

En alternative de ce qui est donné ci-dessus, les enroulements du stator peuvent être court-circuités et traversés par un courant au moyen d'un alimentateur en continue; la valeur du courant qui doit circuler dans les enroulements dépend de la dimension de l'alternateur et de toute manière devra être stabilisée en accord aux valeurs nominales reportées sur la plaque.

### **b) Vérification, à intervalles réguliers, du fonctionnement correct (absence de bruit ou de vibrations anormales).**

A intervalles réguliers, nous recommandons de vérifier que l'alternateur fonctionne régulièrement sans bruit ou vibration anormale. Tel phénomène pourrait dénoter l'endommagement des roulements.

Nous rappelons que l'alternateur ne présente pas de vibrations particulières lorsque les parties tournantes sont parfaitement équilibrées.

En considérant que l'équilibrage du rotor ne soit pas altéré et que les roulements de l'alternateur ne sont pas endommagés, les causes des vibrations présentes sur le groupe électrogène seront à rechercher dans les alignements des accouplements, dans les sollicitations du moteur thermique ou dans les supports anti-vibrations.

Nous recommandons également de vérifier les données fonctionnelles qui doivent être en coordination avec ce qui est reporté sur la plaque de l'alternateur.

### **c) Vérifications mécaniques de tous les boulons de fixations et en particulier des connexions électriques.**

A intervalles réguliers, nous recommandons de vérifier que tous les écrous de fixation soient correctement serrés; une attention particulière doit être apportée aux connexions électriques, opération qui doit être suivie avec l'absolue certitude d'absence de tension. Dans le manuel de l'alternateur sont indiqués les couples de serrage corrects de tous les écrous de dimensions différentes.

## WARTUNG

Der gemessene Widerstandswert aller Wicklungen gegen Erde muss unbedingt mehr als 1M $\Omega$  sein.

In dem Fall, in dem der gemessene Wert niedriger ist im Vergleich zu was oben genannt worden ist, muessen die Wicklungen gelegentlich ausgetrocknet werden.

Dieses Verfahren kann durch den Wurf eines Strahles warmer Luft mit einer Temperatur von 50-60 °C in die Eingänge oder Ausgänge des Stromzeugers ausgeführt werden.

Eine andere Möglichkeit zu o.g. wäre die elektrischen Versorgung der Ständerwicklung. Sie könnte im Prinzip durch einen Gleichstrom von einen separaten Stromerzeugerzeuger mit Strom durchflossen werden. Der Stromwert, welcher in den Spulen sich bewegen muss, hängt von den Wechselstromgeneratorgrößen ab und, darf auf keinen Fall die Nominalwerte des Generators, wie sie auf dem Schild erscheinen überschreiten.

### **b) Ueberprüfungen der richtigen Arbeitsweise (Abwesenheit von Lärmen oder anomalen Schwingungen).**

In regelmässigen Zeitabständen empfehlen wir streng zu überprüfen, ob der Stromerzeuger normal funktioniert, ohne Lärme oder ausserordentliche Schwingungen; die Anwesenheit solcher Laerme koennt auf eine Beschädigung der eingebauten Lager hindeuten. Wir moechten Sie daran erinnern, dass der Wechselstromgenerator selbst normalerweise keine besondere Schwingungen zeigt, weil die rotierenden Teile perfekt balanciert sind. Vorausgesetzt dass die Auswucht nicht verändert worden ist und die Lager des Wechselstromgenerators nicht beschädigt sind, sind die Gründe der Schwingungen auf dem Generator in den Anreihungen der Verbindungen, in den Schwingungen des Antriebs-Motors oder in den Antischwingungs- Auflagen zu finden.

Es wird auch empfohlen, die Übereinstimmung der funktionellen Daten mit den Daten vom Typenschild des Generators zu überprüfen.

### **c) Mechanische Ueberprüfungen über alle Befestigungbolzen und besonders über die elektrische Verbindungen.**

In regelmässige Zeitabstände empfehlen wir zu überprüfen, ob die Befestigungsbolzen angemessen fest sind; eine besondere Aufmerksamkeit muss den elektrischen Verbindungen gegeben werden. Diese Handlung muss ausgeführt werden nur wenn man absolut sicher ist, dass keine Spannung vorhanden ist. Auf dem Hinweisbuch des Stromerzeugers werden die richtigen Befestigungsmomente der verschiedenen Größen der Bolzen mitgeteilt.

## MANTENIMIENTO

El valor medido de resistencia a la tierra de todas las envolturas debe ser superior a 1M $\Omega$ .

En la hipótesis de que el valor medido sea inferior al arriba indicado, las envolturas deben ser oportunamente secadas. Tal operación puede ser hecha direccionando un chorro de aire caliente a aproximadamente 50-60°C, en las entradas o en las salidas de aire del generador.

Alternativamente al indicado arriba, las envolturas de estator pueden ser coligadas electricamente y ser atravesadas por una corriente a través de un alimentador en continuo; el valor de corriente a hacer circular en las envolturas dependerá de las dimensiones del los alternadores y de cualquier forma deberá ser establecido de acuerdo con los valores nominales de la plaquita.

### **b) Verificaciones del correcto funcionamiento (ausencia de ruidos o vibraciones anómalas).**

A intervalos regulares, recomendamos verificar si el generador funciona regularmente sin ruidos o vibraciones anómalas; tales presencias podrían denotar un daño de los cojinetes.

Les recordamos que el alternador por si mismo no presenta vibraciones particulares, ya que las partes rotativas son perfectamente balanceadas. Considerando que el balanceo del rotor no haya sido alterado y que los cojinetes del alternador no hayan sido dañados, las causas de las vibraciones presentes en el grupo electrógeno deberán ser buscadas en los alineamientos de los acoplamientos, en las sollicitaciones del motor térmico o en los soportes antivibrantes.

Se recomienda además, verificar los datos funcionales que deben resultar en línea con aquello que dice la plaquita del generador.

### **c) Verificaciones mecánicas en todos los pernos de fijación y en particular de las conexiones eléctricas.**

A intervalos regulares les recomendamos verificar si todos los pernos de fijación están adecuadamente apretados; una particular atención debe ser dirigida a las conexiones eléctricas, operación que debe ser hecha con la absoluta certeza de ausencia de tensión. En el manual del generador son indicadas los correctos pares de apriete de las varias dimensiones de pernos.

## MANUTENZIONE

### d) Pulizia esterna ed interna del generatore.

Per la pulizia esterna del generatore è possibile utilizzare dell'aria compressa; vietiamo assolutamente l'uso di qualsiasi tipo di idropulitrice e di liquidi detergenti; il grado di protezione standard del generatore è IP21 e pertanto utilizzando liquidi potrebbero verificarsi delle anomalie o anche cortocircuiti.

Gli interventi di manutenzione straordinaria possono essere riassunti in :

- manutenzione dei cuscinetti ed eventuale sostituzione
- pulizia degli avvolgimenti
- sostituzione del ponte a diodi
- sostituzione dell'eccitatrice
- sostituzione del regolatore di tensione
- controllo della tensione residua

### a) Manutenzione dei cuscinetti ed eventuale sostituzione.

Tutti i cuscinetti sono ingrassati in fase di montaggio; il grasso impiegato normalmente è del tipo SKF LGMT2 o equivalenti.

Controlli periodici durante il periodo di funzionamento, devono essere eseguiti per verificare eventuali surriscaldamenti o rumori; eccessive vibrazioni possono essere causate da una usura anomala del cuscinetto.

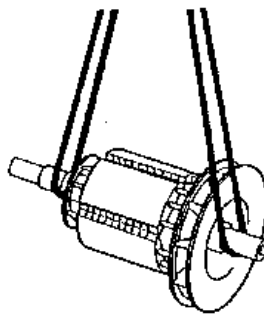
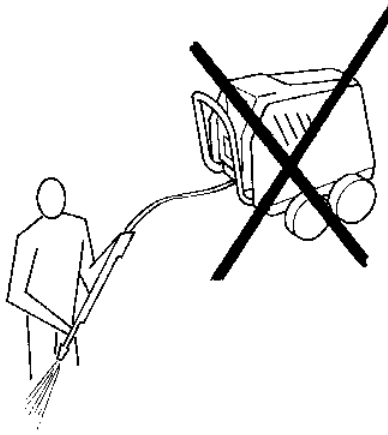
In tal caso, il cuscinetto deve essere smontato per essere esaminato ed eventualmente sostituito.

Qui di seguito viene descritta la procedura per sostituire il cuscinetto.

Per smontare l'alternatore della serie NPE, attenersi alle seguenti istruzioni :

-) rimuovere lo scudo anteriore

-) sfilare il rotore utilizzando un mezzo di sollevamento con funi morbide ma di portata adeguata; verificare che i mezzi di sollevamento predisposti siano comunque adeguati per i pesi dei componenti da movimentare



## MAINTENANCE

### d) Internal and external cleaning of the generator.

For the external cleaning of the generator, you can use compressed air. The use of hydro-cleaners and detergent fluids is strictly forbidden. The standard protection degree of the generator is IP21; therefore, use of fluids could cause anomalies or even short-circuits.

Extraordinary maintenance operations can be summed up as follows:

- Maintenance and replacement (if necessary) of bearings
- Cleaning of windings
- Replacement of diode bridge
- Replacement of exciter
- Replacement of voltage regulator
- Check of residual voltage

### a) Maintenance and replacement (if necessary) of bearings.

During the assembling phase, all bearings are greased with SKF LGMT2 grease, or similar.

During the operating time, checks to detect presence of either overheating, or noises, must be carried out on a regular basis. If the bearing is worn off, it can cause excessive vibrations. In such a case, the bearing must be removed, examined, and if necessary, replaced.

A description of the procedure for a bearing replacement:

To disassemble alternator versions NPE, follow these instructions:

-) remove drive end bracket

-) Use a lifting device equipped with soft ropes of an adequate lifting capacity to extract rotor. Make sure that the lifting devices are suitable for the weight of the parts to be shifted;

MAINTENANCE	WARTUNG	MANTENIMIENTO
<p><b>d) Nettoyage externe et interne de l'alternateur.</b>            Pour le nettoyage externe de l'alternateur, il est possible d'utiliser de l'air comprimé; Il est absolument interdit l'utilisation de quelque type d'hydro-sableuse ou de liquide détergent. Le grade de protection standard de l'alternateur est IP 21 et en conséquence l'utilisation de liquides pourrait amener le constat d'anomalies ou également de court-circuit.</p> <p>Les interventions de maintenances extraordinaires peuvent être résumées ainsi :</p> <p>a) Maintenance des roulements et éventuellement changement.            b) Nettoyage des enroulements.            c) Changement des pont de diodes.            d) Changement de l'excitatrice.            e) Changement du régulateur de tension.            f) Contrôle de la tension résiduelle.</p> <p><b>a) Maintenance des roulements et éventuellement changement.</b>            Tous les roulements sont graissés en phase de montage ; la graisse utilisée normalement est du type SKF LGMT2 ou équivalent.</p> <p>Des contrôles périodiques pendant toute la période de fonctionnement doivent être effectués pour éviter d'éventuelles surchauffes ou des bruits ; des vibrations excessives peuvent être causées par une usure normale des roulements.            Dans de tel cas, le roulement doit être démonté pour être examiné et éventuellement changé.            Ci-dessous description de la procédure pour changer le roulement :</p> <p>Pour démonter l'alternateur de la série NPE :</p> <p>-) enlever le flasque avant</p> <p>-) Démontez le rotor en utilisant un moyen de soulèvement avec des câbles souples mais de portée appropriée; vérifier que les moyens de soulèvement prédisposés soient adéquats pour les poids des composants à bouger.</p>	<p><b>d) Äussere und innerliche Reinigung des Stromerzeugers.</b>            Um den Stromerzeuger draussen zu reinigen, ist es moeglich Druckluft zu verwenden; es ist streng verboten irgendwelche Dampfstrahler oder Reinigungsmittel zu benutzen. Die standard Schutzklasse des Stromerzeugers ist IP 21 und deswegen , wenn man ein fluessiges Reinigungsmittel verwenden sollte, koennen einige Unregelmassigkeiten oder auch ein Kurzschluss auftreten.</p> <p>Die besonderen Wartungsarbeiten koennen wie folgt zusammengefasst werden.</p> <p>a) Instandhaltung der Lager und moeglicher Wechsel            b) Reinigung der Wicklungen            c) Austausch der Diodenbrücke            d) Austausch der Erregermaschine            e) Austausch des Spannungsreglers            f) Kontrolle der Restspannung</p> <p><b>a) Instandhaltung der Lager und eventueller Ersatz.</b>            Alle Lager werden während des Einbauverfahrens geschmiert; die benutzte Schmiere ist normalerweise von Typ SKF LGMT2 oder ähnlich.</p> <p>In diesem Fall muss das Lager abmontiert werden,um untersucht und eventuell gewechselt werden.            Hier unten die Beschreibung des Wechselsverfahrens des Lagers.</p> <p>Um die Stromerzeuger zu demontieren, folgen Sie bitte den Hinweisen:</p> <p>-) Den vorderen Deckel entfernen</p> <p>-) Den Rotor abziehen. Das wird durch einen Flaschenzug mit weichen Stricken gemacht. Sie müssen aber von der richtigen Tragfaehigkeit sein.            überprüfen Sie ob die verwendeten Aufhebenmittel auf jedem Fall fuer die Gewichte der Bestandteile, die bewegt werden müssen angemessen sind.</p>	<p><b>d) Limpieza externa e interna del generador</b>            Para la limpieza externa del generador es posible utilizar aire comprimado; prohibimos absolutamente el uso de cualquier tipo de hidrolimpiadora y de liquidos detergentes; el grado de protección standard del generador es IP21 y por lo tanto utilizando liquidos se podrían verificar anomalías o también cortocircuitos.</p> <p>Las intervenciones de manutención extraordinaria pieden ser resumidas en:</p> <p>a) manutención de los cojinetes y eventual sustitución            b) limpieza de las envolturas            c) sustitución de los puentes a diodos            d) sustitución de la excitadora            e) sustitución del regulador de tensión            f) control de la tensión residual</p> <p><b>a) Manutención de los cojinetes y eventual sustitución</b>            Todos los cojinetes son engrasados en fase de montaje; la grasa empleada normalmente es del tipo SKF LGMT2o equivalente.</p> <p>Controles periodicos durante el periodo de funcionamiento, deben ser llevados a cabo para verificar eventuales sobrecalentados o ruidos; excesivas vibraciones pueden ser causadas por un desgaste anómalo del cojinete.            En tal caso, el cojinete debe ser desmontado para ser examinado y eventualmente sustituido.            A seguir es descrito el procedimiento para sustituir el cojinete.</p> <p>Para desmontar el alternador de la serie NPE, atenerse a las siguientes instrucciones:</p> <p>-) sacar la tapa anterior</p> <p>-) extraer el rotor utilizando un medio de levantamiento con cuerdas blandas pero de capacidad adecuada; verificar que los medios de levantamiento predispuestos sean de todas formas adecuados para los pesos de los componentes a movimentar</p>



## MANUTENZIONE

-) per estrarre il cuscinetto deve essere utilizzato un apposito estrattore

-) per il montaggio del nuovo cuscinetto, riscaldare lo stesso con un apposito dispositivo magnetico

-) indossando gli appositi guanti anti-scottatura, montare il cuscinetto nella sua sede

### b) Pulizia degli avvolgimenti

La durata degli avvolgimenti e quindi del generatore stesso, può essere migliorata da una corretta manutenzione e pulizia; un programma di ispezione e manutenzione dovrebbe essere stabilito tenendo presente che la frequenza di tali verifiche dipenderà dalle condizioni effettive dell'ambiente di utilizzo.

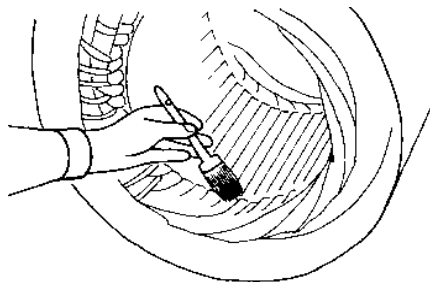
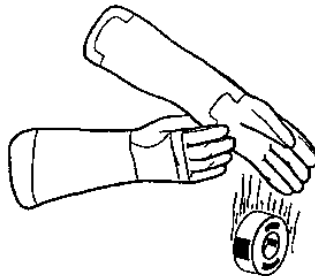
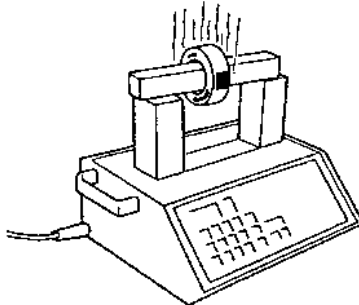
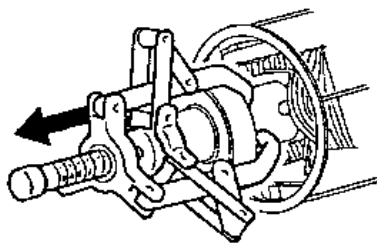
Se il generatore lavora in ambienti asciutti e puliti, un'ispezione all'anno può essere sufficiente; al contrario, se le condizioni sono più severe, è opportuno aumentare la frequenza delle ispezioni.

In ogni caso, indipendentemente dal programma stabilito, raccomandiamo di procedere a tale manutenzione nelle seguenti ipotesi :

- ) presenza di ruggine
- ) segni evidenti di corrosione
- ) deterioramento dell'isolamento
- ) presenza di polvere sulla superficie degli avvolgimenti

Gli avvolgimenti possono essere puliti utilizzando degli appositi solventi come ad esempio "l'acqua regia" o il "solvesso"; tali sostanze, avendo un alto grado di evaporazione, permettono una pulizia adeguata senza intaccare il grado di isolamento degli avvolgimenti.

A pulizia ultimata, raccomandiamo di controllare che non vi siano segni di sovrariscaldamenti ed eventuali tracce di carbonizzazioni.



## MAINTENANCE

-) To pull the bearing out, use a puller

-) To insert new bearing, heat it with a suitable magnetic device

-) Put on safety gloves and insert bearing into its place

### b) Cleaning of windings

Both windings and generator will last longer with a correct maintenance and cleaning; an inspection and a maintenance schedule should be established by keeping in mind that the frequency of these inspections depends on the conditions of the site where the generator is being used.

If the generator is used in a dry and clean environment, an inspection a year is enough; in case of severe conditions, inspections must be carried out more frequently.

However, we recommend that a check should be done, regardless of the schedules, in the following cases:

- ) in case of rust
- ) in case of corrosion
- ) when the insulation is damaged
- ) when there is dust on the surface of the windings

To clean windings, use solvents like oil of turpentine or "Solvesso" solvent. Cleaning with such substances, which contain a high evaporation level, will not damage the isolation level of the windings. When cleaning is over, please look out for any overheating or carbonisation signs.

MAINTENANCE	WARTUNG	MANTENIMIENTO
<p>-) Pour extraire le roulement, il faut utiliser un extracteur spécial.</p> <p>-) Pour le montage du nouveau roulement, réchauffer ce dernier avec un dispositif magnétique spécial.</p> <p>-) Mettre des gants anti-brûlures , installer l'enroulement à sa place.</p>	<p>-) Um das Lager herauszuziehen, muss eine angemessene Abziehvorrichtung verwendet werden.</p> <p>-) Um das neue Lager zu montieren, beheizen Sie es mit einer angemessenen magnetischen Vorrichtung.</p> <p>-) Das Lager durch den Gebrauch der angemessenen Schutzhandschuhen auf seinem Platz montieren.</p>	<p>-) para extraer el cojinete debe ser utilizado un extractor especial</p> <p>-) para el montaje del nuevo cojinete, calentarlo con un dispositivo magnetico especial</p> <p>-) usando los adecuados guantes anti-quemadura, montar el cojinete en su sede</p>
<p><b>b) Nettoyage des enroulements.</b>  La durée de vie des enroulements et donc de l'alternateur même, peut être améliorée par une maintenance et un nettoyage correct ; un programme d'inspection et maintenance devraient être établis en tenant compte que la fréquence de ces vérifications dépendra des conditions réelles de l'air ambiant d'utilisation.  Si l'alternateur travaille dans un milieu sec et propre, une inspection à l'année peut être suffisant ; au contraire, si les conditions sont plus sévères, il est nécessaire d'augmenter la fréquence des inspections.</p> <p>Dans chaque cas et indépendamment du programme établi, nous recommandons de procéder à ces maintenances dans les cas éventuels présents :</p> <ul style="list-style-type: none"> <li>-) Présence de rouille.</li> <li>-) Signes évidents de corrosions.</li> <li>-) Détérioration de l'isolant.</li> <li>-) Présence de poussière sur la surface des enroulements.</li> </ul> <p>Les enroulements peuvent être nettoyés en utilisant des produits appropriés comme par exemple l'essence de térébenthine ou du « solvant ». Ces substances ayant un taux important d'évaporation, ils permettent un nettoyage adéquate sans attaquer le niveau d'isolement des enroulements.  Le nettoyage terminé, nous recommandons de contrôler qu'il n'y ait aucun signe de surchauffe et d'éventuelles traces de carbonisation.</p>	<p><b>b) Reinigung der Wicklungen</b>  Die Lebensdauer der Wicklungen und des Generators kann durch eine richtige Instandhaltung und Reinigung verbessert werden: ein Inspektions und Pflegeprogramm sollte erstellt werden, um den Zeitabstand dieser Nachprüfungen in Abhängigkeit des Aufstellorts zu bestimmen.  Wenn der Stromerzeuger in einer trockenen und sauberen Umwelt arbeitet, wird es genügen, eine Inspektion pro Jahr zu machen.  Wenn dagegen der Aufstellort stärker belastet ist, ist es notwendig, die Häufigkeit der Inspektionen zu erhöhen.</p> <p>Auf jeden Fall , unabhängig von dem vorher gedachten Programm, empfehlen wir das Ganze in den folgenden Fällen pflegen zu lassen.</p> <ul style="list-style-type: none"> <li>- Anwesenheit von Rost</li> <li>- Anzeichen von Korrosion</li> <li>- Beschädigung der Isolierung</li> <li>- Anwesenheit vom Straub auf den Oberflächen der Wicklungen</li> </ul> <p>Die Wicklung kann durch die Benützung der angemessenen Loesungsmittel gereinigt werden, wie zum Beispiel „Harzwasser“ oder „solvesso“.  Dadurch, dass diese Mittel eine sehr hohe Verdunstungsstufe besitzen, wird es moeglich, eine angemessene Reinigungsstufe der Spulen angegriffen wird.  Nach erfolgter Reinigung, empfehlen wir zu kontrollieren , ob es keine Überhitzungsmerkmale oder eventuelle Verkohlungszeichen gibt.</p>	<p><b>b) Limpieza de los envoltorios</b>  La duración de los envoltorios y por consiguiente del propio generador, puede ser mejorada por una correcta manutención y limpieza; un programa de inspección y manutención debería ser establecido teniendo presente que la frecuencia de tales verificaciones dependerá de las condiciones efectivas del ambiente de utilización.  Si el generador trabaja en ambientes secos y limpios, una inspección al año puede ser suficiente; al revés, si las condiciones son más severas, es oportuno aumentar la frecuencia de las inspecciones.</p> <p>De cualquier forma, independientemente del programa establecido, recomendamos proceder a tal manutención en las siguientes hipótesis :</p> <ul style="list-style-type: none"> <li>-) presencia de herrumbre</li> <li>-) señales evidentes de corrosión</li> <li>-) deterioramento del aislamiento</li> <li>-) presencia de polvo en la superficie de los envoltorios</li> </ul> <p>Los envoltorios pueden ser limpiados utilizando solventes especiales como por ejemplo “aguarrás” o el “solveso”; tales substancias, poseendo un alto grado de evaporación, permiten una limpieza adecuada sin corroer el grado de aislamiento de los envoltorios.  Cuando se termine la limpieza, recomendamos verificar si no hay señales de sobrecalentamientos y eventuales trazos de carbonizaciones.</p>

## MANUTENZIONE

Inoltre si consiglia di asciugare gli avvolgimenti a circa 60-80°C e se si notano degradamenti della vernice degli avvolgimenti, procedere ad una ulteriore verniciatura degli stessi.

### c) Sostituzione del ponte a diodi

Ciascun singolo diodo può essere verificato molto facilmente con un multimetro; è sufficiente scollegare il cavetto del diodo in esame e controllarne la resistenza nei due sensi. Un diodo che funziona correttamente indicherà una resistenza molto alta in un senso e molto bassa nel senso opposto. Un diodo guasto avrà o una resistenza molto bassa o una resistenza infinita in entrambi i sensi. Una volta sostituito il settore o l'intero ponte vi raccomandiamo di serrare le relative viti con le corrette coppie di fissaggio e di rispettare le polarità secondo gli schemi e le tabelle forniti da Mecc Alte.

### d) Sostituzione dell'eccitatrice

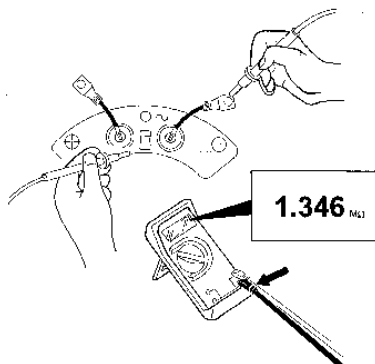
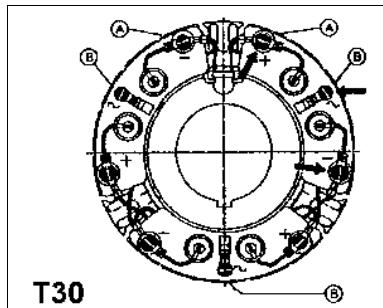
Per smontare l'eccitatrice dell'alternatore della serie NPE, attenersi alle seguenti istruzioni:

-) rimuovere lo scudo anteriore

-) sfilare il rotore utilizzando un mezzo di sollevamento con funi morbide ma di portata adeguata; verificare che i mezzi di sollevamento predisposti siano comunque adeguati per i pesi dei componenti da movimentare

-) per estrarre il cuscinetto deve essere utilizzato un apposito estrattore

-) per smontare il rotore eccitatrice, inserire un adeguato estrattore facilmente costruibile o reperibile presso la nostra sede.



## MAINTENANCE

We also recommend drying up of windings at 60-80°C and if you notice that the varnish of windings is not in good shape, then have them varnished again.

### c) Replacement of diode bridge

Diodes can be easily inspected with a multi-meter: simply disconnect the wire of the particular diode and check its resistance on both directions. A perfectly functioning diode will show a very high resistance in one direction and a very low resistance in the opposite direction. A faulty diode will show either a very low resistance, or an infinite resistance in both directions. Once the whole sector, or the whole bridge, is replaced, remember to tighten the screws with a suitable tightening wrench and to strictly comply with the polarities and the diagrams indicated by Mecc Alte.

### d) Replacement of exciter

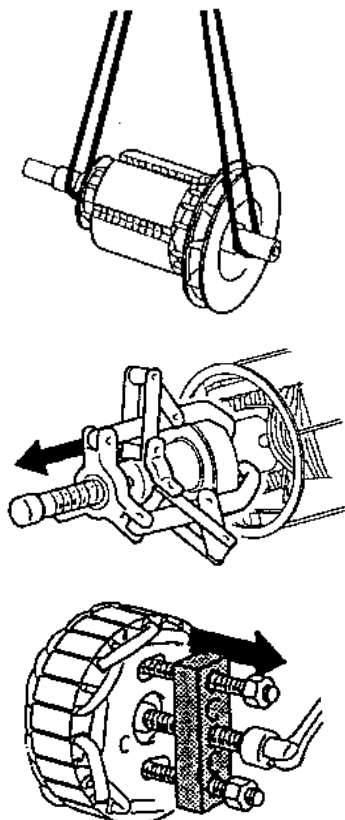
Follow these instructions to remove exciter of the NPE versions:

-) remove drive end bracket

-) Use a lifting device equipped with soft ropes of an adequate lifting capacity to extract rotor. Make sure that the lifting devices are suitable for the weight of the parts to be shifted;

-) Use a puller to pull out bearing

-) To insert the exciter rotor, use a suitable puller, which can be easily constructed or forwarded by the manufacturer upon request.



MAINTENANCE	WARTUNG	MANTENIMIENTO
<p>Sinon, nous conseillons de sécher les enroulements à environ 60-80°C et si on note des dégradations du vernis des enroulements, il faut procéder à un nouveau vernissage.</p>	<p>Ausserdem empfehlen wir die Wicklung mit einer Temperatur von zirka 60-80°rocknen zu lassen, und, wenn man Lacktropfen bemerken sollte, schreiten Sie mit einer neuen Lackierung derjenigen Wicklung fort.</p>	<p>Además, se aconseja secar los envoltorios a aproximadamente 60-80°C y si son notados degradamentos del barniz de los envoltorios, proceder a un ulterior barnizado de los mismos.</p>
<p><b>c) Changement des pont de diodes.</b></p> <p>Chaque diode peut être vérifier très facilement avec un multimètre ; il est suffisant de déconnecter le câble de la diode à examiner et en contrôler la résistance dans les 2 sens. Une diode qui fonctionne correctement indiquera une résistance très haute dans un sens et très basse dans le sens opposé. Une diode en panne aura ou une résistance très basse ou une résistance infinie dans les 2 sens. Une fois changée une partie ou le pont entier, nous vous recommandons de serrer les vis avec les couples de fixation correctes et de respecter les polarités selon les schémas et tableaux fournis par Mecc Alte.</p>	<p><b>c) Ersetzung der Diodenbrücke</b></p> <p>Jede Diode kann sehr einfach mit einem Multimeter nachgeprüft werden; es genügt das Kabel der Dioden abzuklemmen, und den Widerstand in beide Richtungen zu kontrollieren. Ein Diode, die richtig funktioniert, wird einen sehr hohen Widerstand in eine Richtung und einen sehr niedrigen in der entgegengesetzten Richtung zeigen. Eine defekte Diode wird einen sehr niedrigen oder einen unendlichen Widerstand in beiden Richtungen haben. Wenn ein Sektor oder die ganze Bruecke ersetzt werden, empfehlen wir die entsprechenden Schrauben mit passendem Werkzeug festzuziehen und die Polarität nach den von Mecc Alte gegebenen Plänen und Tabellen zu beachten.</p>	<p><b>c) Sustitución de los puentes a diodos</b></p> <p>Cada sencillo diodo puede ser verificado muy facilmente con un multímetro; es suficiente desconectar el cable del diodo en exámen y controlar su resistencia en los dos sentidos. Un diodo que funciona correctamente indicará una resistencia muy alta en un sentido y muy baja en el sentido opuesto. Un diodo averiado tendrá o una resistencia muy baja o una resistencia infinita en ambos sentidos. Una vez sustituido el sector o el puente entero, les recomendamos apretar los relativos tornillos con los correctos pares de fijación y de respetar las polaridades según los esquemas y tablas suministrados por Mecc Alte.</p>
<p><b>d) Changement de l'excitatrice.</b></p> <p>Pour démonter l'excitatrice de l'alternateur de la série NPE, se tenir aux instructions suivantes :</p> <p>-) enlever le flasque avant</p> <p>-) Défiler le rotor en utilisant un moyen de soulèvement avec des câbles souples mais de portée appropriée ; vérifier que les moyens de soulèvement prédéposés soient adéquates pour les poids des composants à bouger.</p> <p>-) Pour extraire le roulement, utiliser un extracteur approprié.</p> <p>-) Pour démonter le rotor d'excitatrice, insérer un extracteur adéquate facilement fabriqué ou trouvé à notre siège.</p>	<p><b>d) Austausch der Erregungsmachine</b></p> <p>Um der Erregerlaefer des Wechselstromerzeugers Serie NPE zu demontieren, folgen Sie bitte die angegebenen Hinweisen:</p> <p>-) Den vorderen Deckel entfernen</p> <p>-) Den Rotor abziehen. Das wird durch einen Aufhebenmittel mit weichen Stricken gemacht. Sie muessen aber von richtigen Trägfähigkeit sein. Ueberpruefen Sie ob die benutzten Hebezeuge auf jeden Fall für die Gewichte der Bestandteile, die bewegt werden muessen, angemessen sind.</p> <p>-) Um das Lager herauszuziehen, muss eine angemessene Abziehvorrichtug verwendet werden.</p> <p>-) Um den Erregerläufer zu demontieren, stecken Sie einen angemessenen Abzieher ein, welchen Sie auch leicht selbst anfertigen lassen können.</p>	<p><b>d) Sustitución de la excitadora</b></p> <p>Para desmontar la excitadora del alternador de la serie NPE, atenerse a las siguientes instrucciones :</p> <p>-) sacar la tapa anterior</p> <p>-) extraer el rotor utilizando un medio de levantamiento con cuerdas blandas pero de capacidad adecuada; verificar que los medios de levantamiento predispuestos sean de todas formas adecuados para los pesos de los componentes a movimentar</p> <p>-) para extraer el cojinete debe ser utilizado un extractor especial</p> <p>-) para desmontar el rotor excitadora, inserir un adecuado extractor facilmente costruible o de encontrar en nuestra sede.</p>

## MANUTENZIONE

### e) Sostituzione del regolatore di tensione

I generatori sono provvisti di regolatore automatico di tensione; a seconda del tipo di alternatore, i regolatori elettronici possono essere di due tipi : SR7/2-G, UVR6/1-F.

Nel caso in cui si riscontrassero dei comportamenti anomali vi preghiamo di consultare il manuale specifico o di contattare il nostro servizio di assistenza tecnica.

Una volta stabilito che il regolatore deve essere sostituito, procedere come segue :

-) scollegare tutti i cavetti di collegamento in morsettiera

-) svitare le viti di bloccaggio del regolatore

-) collocare il nuovo regolatore nella posizione prevista

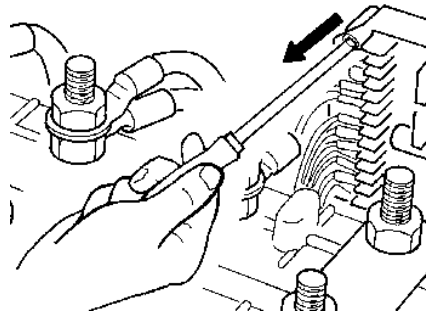
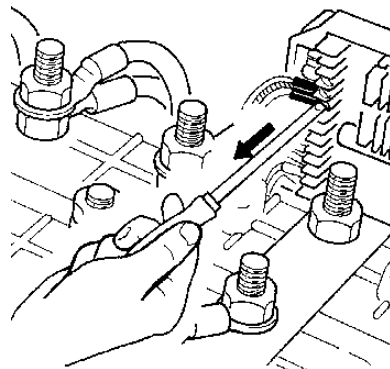
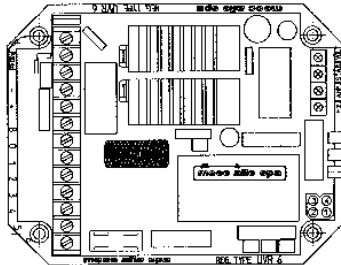
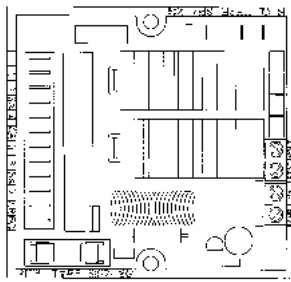
-) fissare il nuovo regolatore con le viti precedentemente raccolte

-) ricollegare tutti i cavi alla morsettiera del regolatore, servendosi in caso di bisogno, degli schemi forniti da Mecc Alte.

### f) Controllo della tensione residua

La seguente procedura è applicabile ai generatori muniti di regolatore elettronico e deve essere applicata nell'eventualità che il generatore non si autoecciti (in tale condizione, pur ruotando alla velocità nominale, non è presente tensione nella morsettiera principale del generatore):

-) con il generatore fermo, rimuovere il coperchio di chiusura della scatola morsetti



## MAINTENANCE

### e) Replacement of voltage regulator

All generators are equipped with an automatic voltage regulator; depending on the alternator model, electronic regulators can be of two different types: SR7/2-G, UVR6/1-F.

Should some anomalous functioning be detected, please consult our technical manual or contact our technical assistance service.

Once it has been ascertained that the regulator needs to be replaced, proceed as follows:

-) Disconnect all terminal board wires

-) Unscrew the clamp screws of the regulator

-) Set new regulator in the usual position

-) Tighten the new regulator with the previously unscrewed screws

-) Connect again all wires to the terminal board of the regulator. Follow diagrams supplied by Mecc Alte, if necessary.

### f) Check of residual voltage

For generators equipped with an electronic regulator, you must perform the following procedure. This must be applied to ensure that the generator is not over-excited (in such a condition, though it still rotates at nominal velocity, no voltage is present in the generator's main terminal board):

-) When the generator is switched off, remove lid from the terminals case

MAINTENANCE	WARTUNG	MANTENIMIENTO
<p><b>e) Changement du régulateur de tension.</b>  Les alternateurs sont pourvus de régulateur de tension automatique ; selon le type de l'alternateur, les régulateurs électroniques peuvent être de 2 types : SR7/2-G, UVR6/1-F.</p> <p>Dans le cas où des comportements anormaux seraient rencontrés, nous vous prions de consulter le manuel spécifique ou de contacter notre service d'assistance technique.</p> <p>Une fois établie que le régulateur doit être changé, procéder comme suit :</p> <p>-) Déconnecter tous les câbles de branchement de la planchette.</p> <p>-) Dévisser les vis de blocage du régulateur.</p> <p>-) Connecter le nouveau régulateur à l'endroit prévu</p> <p>-) Installer le nouveau régulateur avec les vis précédemment récupérées.</p> <p>-) Reconnecter tous les câbles à la planchette du régulateur, en se servant si besoin, des schémas fournis par Mecc Alte.</p> <p><b>f) Contrôle de la tension résiduelle.</b>  La procédure suivante est applicable aux générateurs munis de régulateur électronique et doit être appliquée dans le cas où l'alternateur ne s'auto-excite pas (dans de telles conditions, à la vitesse nominale, il ne doit pas y avoir de tension dans la planchette principale de l'alternateur) :</p> <p>-) Avec l'alternateur arrêté, enlever le couvercle de fermeture de la boîte à bornes.</p>	<p><b>e) Austausch des Spannungsregler</b>  Die Stromerzeuger sind mit einem automatischen Spannungsregler ausgerüstet; je nach Typ des Wechselstromerzeuger koennen die elektrischen Regler von zwei Arten sein: SR7/2-G, UVR6/1-F.</p> <p>Im Fall, dass man unregelmässige Verhalten bemerken sollte, bitten wir Sie das spezifische Hinweisebuch nachzuschlagen oder sich mit unserem technischen Dienst in Verbindung zu setzen.</p> <p>Nachdem festgestellt worden ist, dass der Regler gewechselt werden muss, setzen Sie wie folgt fort:</p> <p>-) Alle Leitungen vom Klemmenbrett abklemmen</p> <p>-) Die Befestigungsschrauben des Reglers abschrauben</p> <p>-) Den neuen Regler in die vorgesehene Stelle setzen</p> <p>-) Den neuen Regler mit den vorhergesammelten Schrauben fixieren</p> <p>-) Alle Kabel mit dem Klemmenbrett des Reglers wieder verbinden Im Notfall, verwenden Sie bitte die von Mecc Alte angegebenen Pläne</p> <p><b>f) Ueberprüfung der Restspannung</b>  Das folgende Verfahren ist bei Stromerzeugern mit einem elektronischen Läufer anzuwenden bei denen festgestellt wurde, dass der Stromerzeuger sich nicht selbst erregt. (in diesem Fall, auch wenn er sich mit seiner nominalen Geschwindigkeit dreht und keine Spannung an dem Hauptklemmenbrett des Stromerzeugers vorhanden ist.)</p> <p>-) Den Deckel des Klemmenschaltposten entfernen, wenn der Stromerzeuger still steht</p>	<p><b>e) Sustitución del regulador de tensión</b>  Los generadores poseen regulador automatico de tensión; dependiendo del tipo de alternador, los reguladores electrónicos pueden ser de dos tipos: SR7/2-G, UVR6/1-F.</p> <p>Caso se encontrasen comportamientos anómalos, les rogamos consultar el manual específico o contactar nuestro servicio de asistencia técnica.</p> <p>Una vez establecido que el regulador debe ser sustituido, proceder como sigue:</p> <p>-) desconectar todos los cabos de conexión en la caja de bornes</p> <p>-) destornillar los tornillos de bloque del regulador</p> <p>-) colocar el nuevo regulador en la posición prevista</p> <p>-) fijar el nuevo regulador con los tornillos precedentemente recojidos</p> <p>-) reconectar todos los cables a la caja de bornes del regulador, utilizando, en caso de necesidad, los esquemas suministrados por Mecc Alte.</p> <p><b>f) Control de la tensión residual</b>  El siguiente procedimiento es aplicable a los generadores con regulador electrónico y debe ser aplicado en la eventualidad de que el generador no se auto-excite (en tal condición, mismo girando a la velocidad nominal, no es presente tensión en la caja de bornes principal del generador):</p> <p>-) con el generador parado, sacar la tapa de cierre de la caja de bornes</p>

## MANUTENZIONE

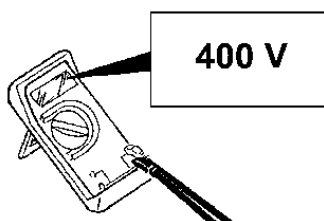
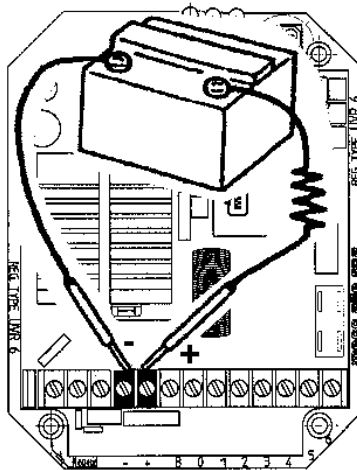
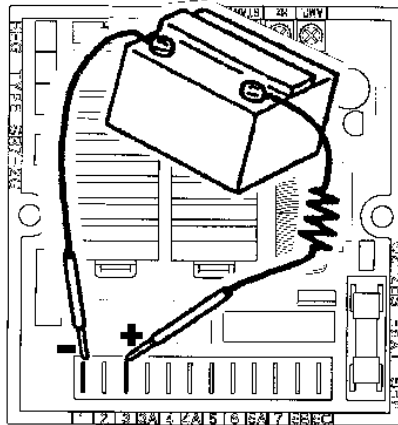
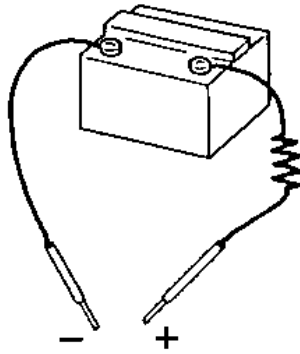
-) predisporre due terminali collegati ad una batteria da 12 Vdc con in serie una resistenza da 30  $\Omega$

-) individuare con l'ausilio degli schemi elettrici forniti da Mecc Alte, i morsetti "+" e "-" del regolatore elettronico

-) avviare il generatore

-) applicare per un istante i due terminali ai morsetti precedentemente individuati facendo molta attenzione nel rispettare le polarità (morsetto "+" del regolatore con morsetto "+" della batteria, morsetto "-" del regolatore con morsetto "-" della batteria)

-) verificare con un voltmetro o con la relativa strumentazione da quadro, che il generatore generi la tensione nominale prevista nella targhetta.



## MAINTENANCE

-) Connect two connecting wires to a 12 Vdc battery with a 30 $\Omega$  in-series resistance

-) Follow the electrical diagrams supplied by Mecc Alte, to locate positive and negative terminals of electronic regulator

-) Start generator

-) Connect, only for a moment, the two connecting wires to the previously located terminals. Make sure to match polarities (positive terminal of regulator with positive terminal of battery, negative terminal of regulator with negative terminal of battery)

-) Use a voltmeter or the right instrument panel, to check whether the generator is producing the nominal voltage indicated on the plate.

MAINTENANCE	WARTUNG	MANTENIMIENTO
<p>-) Préparer 2 bornes connectées à une batterie de 12 Vdc avec en série une résistance de 30 ohms.</p> <p>-) Déterminer avec l'aide des schémas électriques fournis par Mecc Alte , les bornes « + » et « - » du régulateur électronique.</p> <p>-) Démarrer l'alternateur.</p> <p>-) Appliquer pour un instant les 2 bornes aux planchettes précédemment déterminées en faisant très attention à respect la polarité (borne « + » du régulateur avec borne « + » de la batterie, borne « - » du régulateur avec borne « - » de la batterie).</p> <p>-) Vérifier avec un voltmètre ou avec un tableau de bord que l'alternateur génère la tension nominale prévue sur la plaque.</p>	<p>-) Zwei Leitungen mit einer 12 Vdc Batterie und einem in Reihe geschalteten Widerstand von 30Ω vorbereiten</p> <p>-) Mit der Hilfe der von Mecc Alte angegebenen elektrischen Schemas die "+“ oder "-“ Klemmen des elektronischen Reglers bestimmen</p> <p>-)Den Stromerzeuger einschalten</p> <p>-) Für einen Augenblick die zwei Leitungen an die vorher bestimmten Klemmen anbringen. Passen Sie bitte auf, die Polarität einzuhalten (Klemme "+“ des Reglers mit Klemme "+“ der Batterie, Klemme "- " des Reglers mit Klemme "-“der Batterie)</p> <p>-) Mit einem Voltmeter oder Multimeter messen, ob die erzeugte Spannung des Stromerzeugers mit der nominellen auf dem Typenschild geschriebenen Spannung übereinstimmt.</p>	<p>-) predisponer dos terminales coligados a una batería de 12 Vdc con en serie una resistencia de 30 Ω</p> <p>-) individualizar con el auxilio de los esquemas eléctricos suministrados por Mecc Alte, los bornes "+“ y "-“ del regulador electrónico</p> <p>-) encender el generador</p> <p>-) aplicar por un instante los dos terminales a bornes precedentemente individuados con mucha atención para respetar las polaridades (borne "+“ del regulador con borne "+“ de la batería, borne "-“ del regulador con borne "-“ de la batería)</p> <p>-) verificar con un voltímetro o con la relativa instrumentación de cuadro, que el generador genere la tensión nominal prevista en la plaquita.</p>

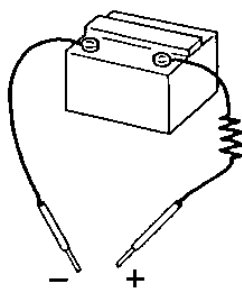


## ANOMALIE E RIMEDI

## DEFECTS AND

### IL GENERATORE NON SI ECCITA

- Controllare il fusibile.
- Aumentare la velocità del 15%.
- Applicare per un istante al "+" e al "-" del regolatore elettronico, una tensione di 12 V di una batteria con in serie una resistenza di 30 Ω rispettando le polarità.



### ALTERNATOR DOES NOT EXCITE

- Substitute fuse.
- Increase speed by 15%.
- For an instant apply on "+" and "-" of the electronic regulator a 12 V battery voltage with a 30 Ω resistor in series, respecting the polarities.

### DOPO ECCITATO SI DISECCITA

- Controllare i cavi di collegamento servendosi dei disegni allegati.

### AFTER BEING EXCITED ALTERNATOR DOES NOT EXCITE

- Check connection cables as per attached drawings.

### A VUOTO TENSIONE BASSA

- Ritarare la tensione.
- Controllare il numero di giri.
- Controllare gli avvolgimenti.

### LOW VOLTAGE AT NO LOAD

- Reset voltage potentiometer.
- Check speed.
- Check windings.

### A VUOTO TENSIONE TROPPO ALTA

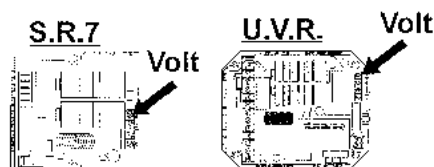
- Ritarare la tensione.
- Sostituire il regolatore.

### HIGH VOLTAGE AT NO LOAD

- Reset voltage potentiometer.
- Substitute regulator.

### A CARICO TENSIONE INFERIORE ALLA NOMINALE

- Ritarare la tensione.
- Corrente troppo alta, cos φ inferiore a 0.8, velocità inferiore del 4% della nominale.
- Sostituire il regolatore.
- Controllare i diodi scollegando i cavi.



### AT LOAD CONDITIONS, VOLTAGE LOWER THAN RATED VALUE

- Reset voltage potentiometer.
- Current too high, power factor lower than 0.8, speed lower than 4% of rated speed.
- Substitute regulator.
- Check diodes, disconnect cables.

### A CARICO TENSIONE SUPERIORE ALLA NOMINALE

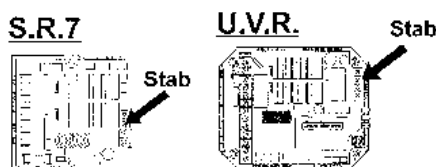
- Ritarare la tensione.
- Sostituire il regolatore.

### AT LOAD CONDITIONS, VOLTAGE HIGHER THAN RATED VOLTAGE

- Reset voltage potentiometer.
- Substitute regulator.

### TENSIONE INSTABILE

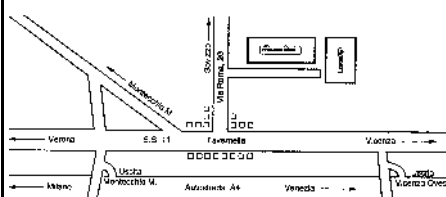
- Controllare uniformità di rotazione.
- Regolare la stabilità del regolatore agendo sul potenziometro "STAB".



### UNSTABLE VOLTAGE

- Check uniformity of rotation.
- Regulate stability of regulator by acting on "STAB." potentiometer.

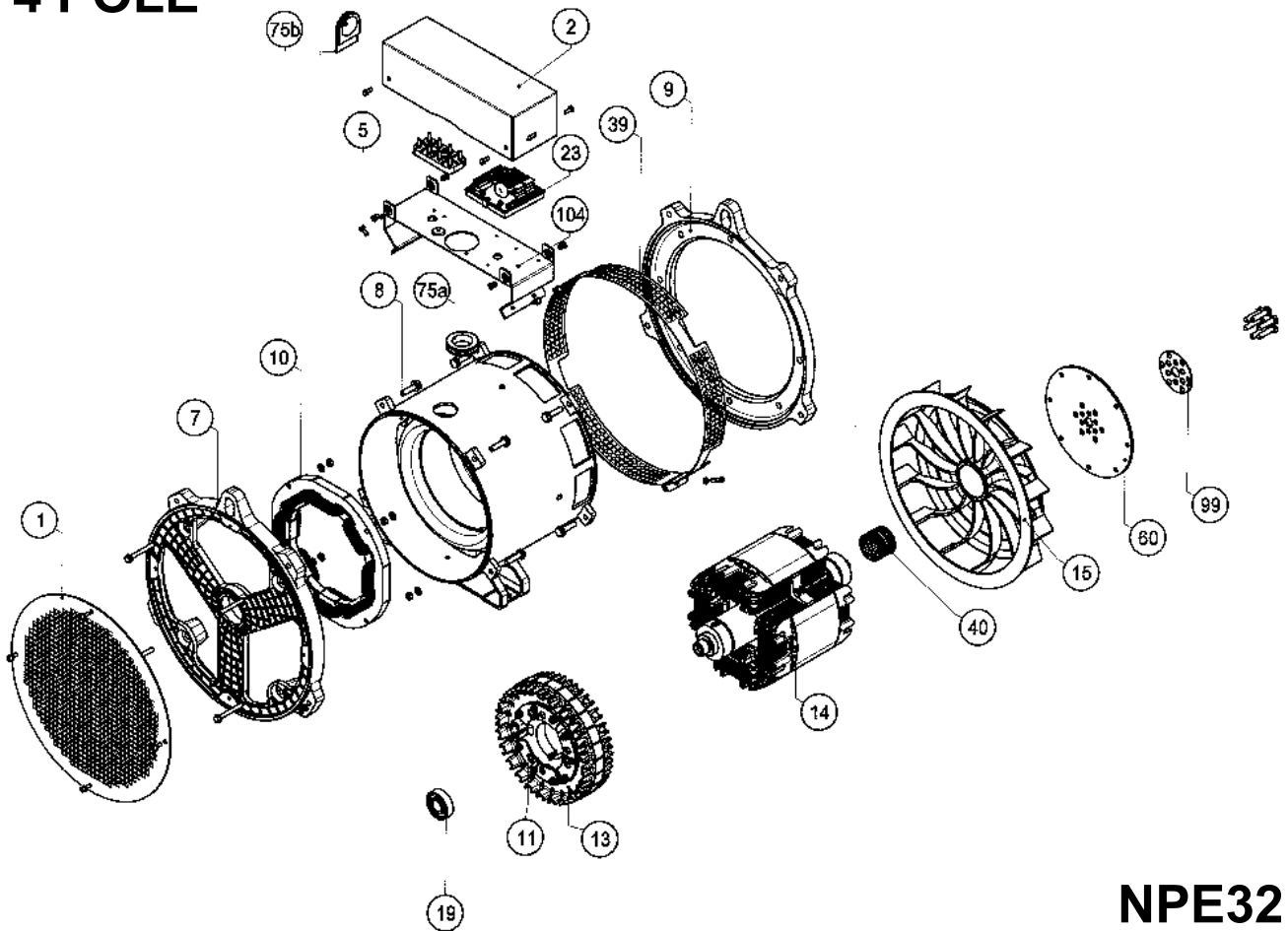
Per qualsiasi altra anomalia rivolgersi al rivenditore, ai centri di assistenza autorizzati o direttamente alla Mecc Alte.



For any other defect, please contact the seller, the after-sales service or Mecc Alte directly.

ANOMALIES ET REPARAT.	STÖRUNGEN UND ABHILFE	PROBLEM. Y SOLUCIONES
<p><b>L'ALTERNATEUR NE S'EXCITE PAS</b></p> <ul style="list-style-type: none"> <li>- Changer le fusible.</li> <li>- Augmenter la vitesse de 15%.</li> <li>- Appliquer un court instant sur les bornes "+" et "-" du régulateur électronique une tension de 12 V. à partir d'une batterie. Bien respecter la polarité et insérer une résistance de 30 Ω.</li> </ul>	<p><b>DER GENERATOR ERREGT SICH NICHT</b></p> <ul style="list-style-type: none"> <li>- Sicherung austauschen.</li> <li>- Die Drehzahl um 15% erhöhen.</li> <li>- Kurze Zeit an die Plus und Minuspol des elektronischen Reglers eine Batteriespannung von 12 V. anlegen. Dabei ist ein Widerstand von 30 Ω in Reihe zur Batterie zu schalten Polarität beachten.</li> </ul>	<p><b>GENERADOR NO SE EXCITA</b></p> <ul style="list-style-type: none"> <li>- Sustituir fusible.</li> <li>- Aumentar la velocidad un 15%.</li> <li>- Aplicar durante un instante en los terminales "+" y "-" del regulador electrónico una tensión de 12V. de una batería con una resistencia en serie de 30 Ω respetando la polaridad.</li> </ul>
<p><b>APRES REEXCITATION SE DESEXCITE</b></p> <ul style="list-style-type: none"> <li>- Contrôler les enroulements avec les schémas électriques.</li> </ul>	<p><b>AUSFALL DES GENERATORS NACH ERREGUNG</b></p> <ul style="list-style-type: none"> <li>- Mit Hilfe der beiliegenden Abbildungen die Anschlüsse kontrollieren.</li> </ul>	<p><b>DESPUES DE EXCITADO SE DESEXCITA</b></p> <ul style="list-style-type: none"> <li>- Comprobar los cables de conexión sirviéndose del esquema adjunto.</li> </ul>
<p><b>A VIDE TENSION TROP BASSE</b></p> <ul style="list-style-type: none"> <li>- Retarder la tension.</li> <li>- Contrôler la vitesse.</li> <li>- Contrôler les enroulements.</li> </ul>	<p><b>NIEDRIGE SPANNUNG BEI LEERLAUF</b></p> <ul style="list-style-type: none"> <li>- Die Spannung nachstellen.</li> <li>- Drehzahl kontrollieren.</li> <li>- Die Wicklungen kontrollieren.</li> </ul>	<p><b>EN VACIO TENSION BAJA</b></p> <ul style="list-style-type: none"> <li>- Retardar la tensión.</li> <li>- Controlar el número de RPM.</li> <li>- Controlar los bobinados.</li> </ul>
<p><b>A VIDE TENSION TROP ELEVEE</b></p> <ul style="list-style-type: none"> <li>- Régler le potentiomètre.</li> <li>- Changer le régulateur.</li> </ul>	<p><b>ZU HOHE SPANNUNG BEI LEERLAUF</b></p> <ul style="list-style-type: none"> <li>- Die Spannung nachstellen.</li> <li>- Den Regler austauschen.</li> </ul>	<p><b>EN VACIO TENSION ELEVADA</b></p> <ul style="list-style-type: none"> <li>- Retardar la tensión.</li> <li>- Sustituir regulador.</li> </ul>
<p><b>EN CHARGE LA TENSION EST INFÉRIEURE A LA TENSION NOMINALE</b></p> <ul style="list-style-type: none"> <li>- Retarder la tension.</li> <li>- Courant trop élevé, ou <math>\cos \varphi</math> inférieur à 0.8, ou vitesse au dessous de -4% de la nominale.</li> <li>- Remplacer le régulateur.</li> <li>- Contrôler les diodes en disjoignant les cables.</li> </ul>	<p><b>BEI BELASTUNG NIEDRIGERE SPANNUNG ALS NORMAL</b></p> <ul style="list-style-type: none"> <li>- Die Spannung nachstellen.</li> <li>- Zu hohen Strom, <math>\cos \varphi</math> kleiner als 0.8 oder Geschwindigkeit 4% niedriger als Nenngeschwindigkeit.</li> <li>- Den Regler austauschen.</li> <li>- Die Dioden kontrollieren.</li> </ul>	<p><b>EN CARGA TENSION INFERIEUR A LA NOMINAL</b></p> <ul style="list-style-type: none"> <li>- Retardar la tensión.</li> <li>- Corriente muy alta, <math>\cos \varphi</math> inferior 0.8, velocidad inferior al 4% de la nominal.</li> <li>- Sustituir regulador.</li> <li>- Comprobar los diodos desconectando los cables.</li> </ul>
<p><b>EN CHARGE, LA TENSION EST SUPERIEURE A LA NOMINALE</b></p> <ul style="list-style-type: none"> <li>- Régler le régulateur.</li> <li>- Changer le régulateur.</li> </ul>	<p><b>BEI BELASTUNG HÖHERE SPANNUNG ALS NORMAL</b></p> <ul style="list-style-type: none"> <li>- Die Spannung nachstellen.</li> <li>- Den Regler austauschen.</li> </ul>	<p><b>EN CARGA TENSION SUPERIOR A LA NOMINAL</b></p> <ul style="list-style-type: none"> <li>- Retardar la tensión.</li> <li>- Sustituir regulador.</li> </ul>
<p><b>TENSION INSTABLE</b></p> <ul style="list-style-type: none"> <li>- Contrôler la stabilité de la vitesse.</li> <li>- Régler la stabilité en agissant sur le potentiomètre "STAB".</li> </ul>	<p><b>UNSTABILE SPANNUNG</b></p> <ul style="list-style-type: none"> <li>- Drehzahlpendelung beseitigen.</li> <li>- Die Spannung über das Potentiometer "STAB." des Reglers stabilisieren.</li> </ul>	<p><b>TENSION INESTABLE</b></p> <ul style="list-style-type: none"> <li>- Controlar uniformidad de rotación.</li> <li>- Regular la estabilidad del regulador actuando sobre el potenciómetro "STAB".</li> </ul>
<p>Pour n'importe quelles autres anomalies, se référer au revendeur, aux centres d'assistance ou directement à Mecc Alte.</p>	<p>Bei Auftreten von anderen Störungen, wenden Sie sich bitte an den Händler, an die Service-Zentralen oder direkt an die Firma Mecc Alte.</p>	<p>En caso de cualquier tipo de problema dirigirse siempre al revendedor, centros de reparación o directamente a la Mecc Alte.</p>

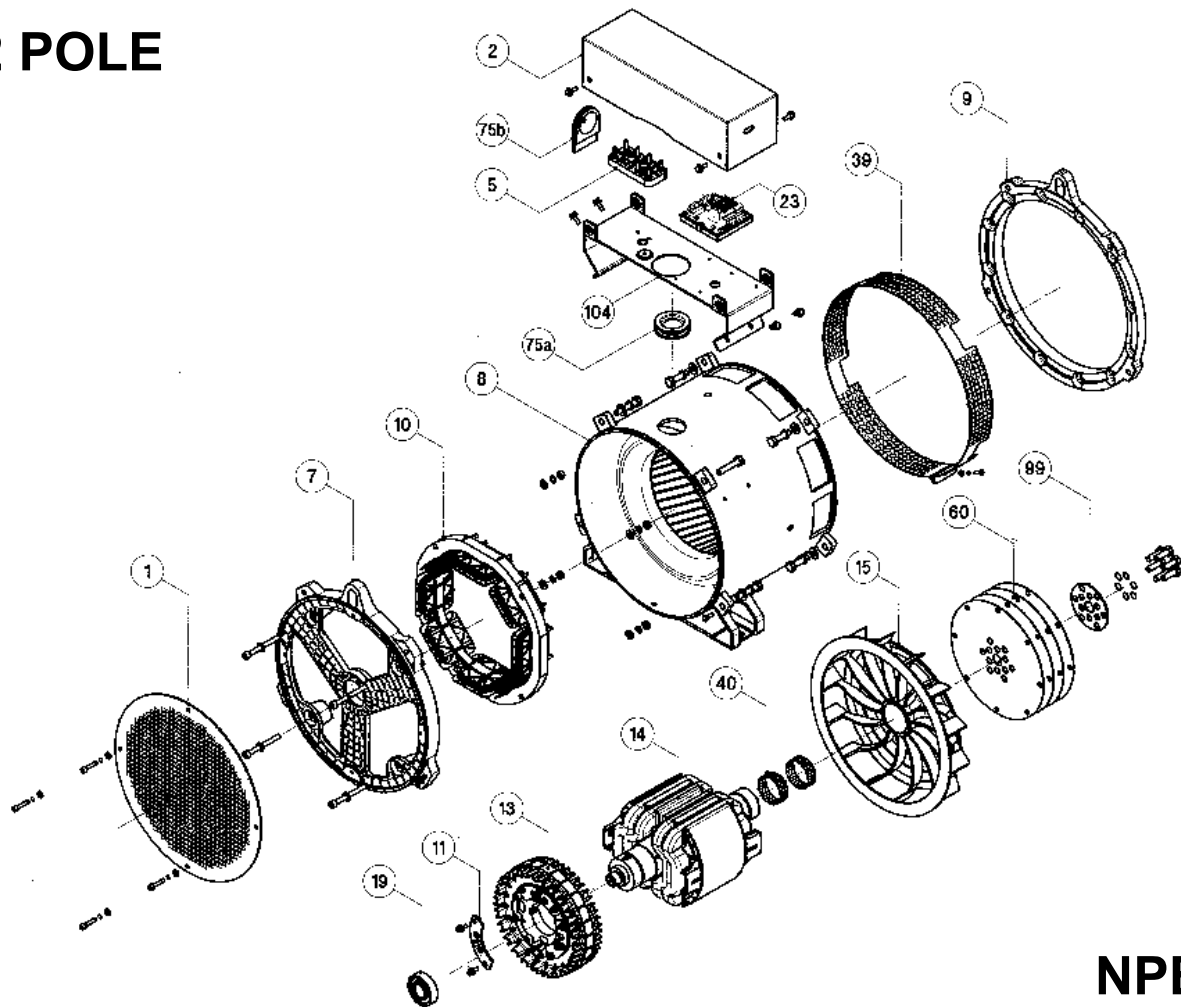
# 4 POLE



## NPE32

N.	DENOMINAZIONE	NAME	DESIGNATION	BEZEICHNUNG	DENOMINACION
1	chiusura posteriore	rear seal	tole de fermeture	Deckel	cierre posterior
2	cuffia	terminal box lid	couvercle	deckel	tapa
5	m orsettiera di utilizzo	terminal board	blanchette a bornes	klemmenbrett	placa de bornes
7	coperchio posteriore	rear cover	flasque arrière	hinteres Gehäuse	tapa posterior
8	carcasa con statore	frame with stator	carcasse avec stator	Gehäuse mit stator	carcaza con estator
9	coperchio anteriore	front cover	flasque avant	vorderes Gehäuse	tapa anterior
10	statore eccitatrice	exciting stator	stator excitatrice	Erregerstator	estator excitatriz
11	settore per ponte rotante T30	sector for rotating bridge T30	secteur pour pont tournant T30	dioden segment für T30	sector por puente diodos giratorios T30
13	indotto eccitatrice	exciting armature	rotor excitatrice	Erregeranker	inducido excitatriz
14	induttore rotante	rotor	roue polaire	Rotor	inducido rotante
15	ventola	fan	ventilateur	Lüfterrad	ventilador
19	cuscinetto posteriore	rear bearing	roulement arrière	hinteres Lager	cojinete posterior
23	regolatore elettronico SR7	electronic regulator SR7	regulateur electronique SR7	electronischer regle SR7	regulador electronico SR7
39	rete di protezione	protection screen	grille de protection	schutzgitter	rejilla proteccion
40	anello compensatore SV 60-522	fixing ring SV60-522	rondelle de bloquage SV60-522	toleranzringe SV60-522	anello de fijacion SV60-522
60	dischi	disc plates	disques	Kupplungsscheiben	discos
75a	gommino passacavo	cable grommet	pass cable en caoufchoul	gummi auge	goma pasacables
75b	anello bloccaggio dischi	disc locking ring	anneau blocage des disques	spannring distanzscheiben	anello de bloc. discos separadores
104	pannello portacomponenti	component-carrying panel	panneau support composant	komponentenblechtafel	panel porta componentes

# 2 POLE



## NPE31

N.	DENOMINAZIONE	NAME	DESIGNATION	BEZEICHNUNG	DENOMINACION
1	chiusura posteriore	rear seal	tole de fermeture	Deckel	cierre posterior
2	cuffia	terminal box lid	couvercle	deckel	tapa
5	m orsettiera di utilizzo	terminal board	blanchette a bornes	klemmenbrett	placa de bornes
7	coperchio posteriore	rear cover	flasque arriere	hinteres Gehäuse	tapa posterior
8	carcassa con statore	frame with stator	carcasse avec stator	Gehäuse mit stator	carcaza con estator
9	coperchio anteriore	front cover	flasque avant	vorderes Gehäuse	tapa anterior
10	statore eccitatrice	exciting stator	stator excitatrice	Erregerstator	estator excitatriz
11	settore per ponte rotante T30	sector for rotating bridge T30	secteur pour pont tournant T30	dioden segment für T30	sector por puente diodos giratorios T30
13	indotto eccitatrice	exciting armature	rotor excitatrice	Erregeranker	inducido excitatriz
14	induttore rotante	rotor	roue polaire	Rotor	inducido rotante
15	ventola	fan	ventilateur	Lüfterrad	ventilador
19	cuscinetto posteriore	rear bearing	roulement arriere	hinteres Lager	cojinete posterior
23	regolatore elettronico SR7	electronic regulator SR7	regulateur electronique SR7	electronischer regle SR7	regulador electronico SR7
39	rete di protezione	protection screen	grille de protection	schutzgitter	rejilla proteccion
40	anello compensatore SV 60-522	fixing ring SV60-522	rondelle de bloquage SV60-522	toleranzringe SV60-522	anillo de fijacion SV60-522
60	dischi	disc plates	disques	Kupplungsscheiben	discos
75a	gommino passacavo	cable grommet	pass cable en caoufchoul	gummi auge	goma pasacables
75b	anello bloccaggio dischi	disc locking ring	anneau blocage des disques	spannring distanzscheiben	anillo de bloc. discos separadores
99	anello bloccaggio dischi	disc locking ring	anneau blocage des disques	spannring distanzscheiben	anillo de bloc. discos separadores
104	pannello portacomponenti	component-carrying panel	panneau support composant	komponentenblechtafel	panel porta componentes

TIPO TYPE TYP	V - Hz	GENERATORE GENERATOR PARTIE PUISSANCE GENERADORES			ECCITATRICE EXCITER EXCITATRICE ERREGER EXCITATRIZ	
		STATORE STATOR 1-2  Ω	ROTORE ROTOR  Ω	AVVOLGIMENTO AUSILIARIO AUXILIARY WINDING HILFS WICKLUNG BOBINADO AUXILIAR  Ω	STATORE STATOR  Ω	ROTORE FASE-FASE ROTOR PHASE-PHASE  Ω

### GENERATORI 4 POLI - 4 POLE GENERATORS - ALTERNATEURS 4 POLES

#### GENERATOREN 4 POLIG - GENERADORES 4 POLOS

##### 3 Phase (0,8 p.f.)

NPE32-A/4	115/200/230/400-50	1,210	1,216	7,33	11,05	0,320
NPE32-B/4	115/200/230/400-50	0,727	1,293	3,50	11,05	0,320
NPE32-C/4	115/200/230/400-50	0,438	1,376	5,70	11,05	0,320
NPE32-D/4	115/200/230/400-50	0,274	1,491	5,10	11,05	0,320
NPE32-E/4	115/200/230/400-50	0,147	1,697	1,79	11,05	0,320
NPE32-F/4	115/200/230/400-50	0,114	1,853	1,05	11,05	0,320

##### 1 Phase (1 p.f.)

NPE32-A/4	115/230-50	0,426	1,216	2,760	11,05	0,320
NPE32-B/4	115/230-50	0,297	1,293	1,950	11,05	0,320
NPE32-C/4	115/230-50	0,221	1,376	1,995	11,05	0,320
NPE32-D/4	115/230-50	0,148	1,491	1,563	11,05	0,320
NPE32-E/4	115/230-50	0,078	1,697	1,247	11,05	0,320
NPE32-F/4	115/230-50	0,056	1,853	1,149	11,05	0,320

NPE32-A/4	120/240-60	0,350	1,216	2,55	11,05	0,320
NPE32-B/4	120/240-60	0,225	1,293	1,99	11,05	0,320
NPE32-C/4	120/240-60	0,173	1,376	1,73	11,05	0,320
NPE32-D/4	120/240-60	0,112	1,491	1,37	11,05	0,320
NPE32-E/4	120/240-60	0,062	1,697	1,15	11,05	0,320
NPE32-F/4	120/240-60	0,045	1,853	1,01	11,05	0,320

### GENERATORI 2 POLI - 2 POLE GENERATORS - ALTERNATEURS 2 POLES

#### GENERATOREN 2 POLIG - GENERADORES 2 POLOS

##### 3 Phase (0,8 p.f.)

NPE31-B/2	115/200/230/400-50	0,977	2,502	5,14	11,05	0,320
NPE31-C/2	115/200/230/400-50	0,640	2,633	4,6	11,05	0,320
NPE31-D/2	115/200/230/400-50	0,257	2,814	3,82	11,05	0,320
NPE31-F/2	115/200/230/400-50	0,122	3,363	1,05	11,05	0,320

##### 1 Phase (1 p.f.)

NPE31-C/2	115/230-50	0,245	2,633	1,86	11,05	0,320
NPE31-E/2	115/230-50	0,081	3,021	1,25	11,05	0,320

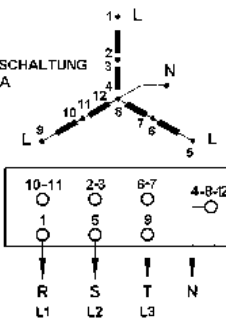
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# 2

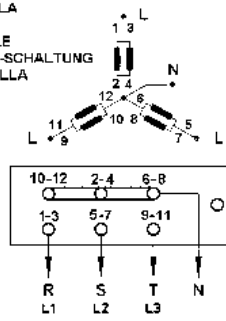
COLLEGAMENTI GENERATORI A 12 FILI  
CONNECTIONS FOR 12 LEAD ALTERNATORS  
CONNECTIONS ALTERNATEURS 12 FILS  
ANSCHLUSSE DER GENERATOREN MIT 12 WICKLUNSENDEN  
CONEXION ALTERNADOR DE 12 HILOS



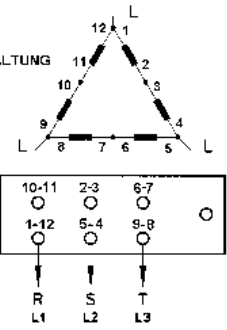
SERIE STELLA  
SERIES STAR  
SERIE ETOILE  
STERN-REIHEN-SCHALTUNG  
SERIE ESTRELLA



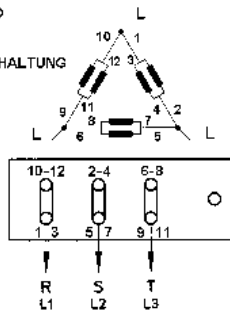
PARALLELO STELLA  
PARALLEL STAR  
PARALLELE ETOILE  
STERN-PARALLELE-SCHALTUNG  
PARALELO ESTRELLA



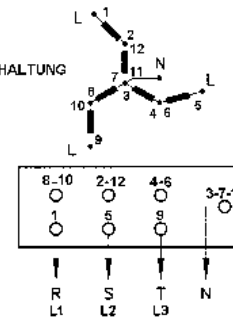
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SERIES DELTA  
SERIE TRIANGLE  
DREIECK-REIHEN-SCHALTUNG  
SERIE TRIANGULO



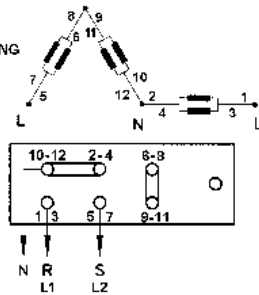
PARALLELO TRIANGOLO  
PARALLEL DELTA  
PARALLELE TRIANGLE  
DREIECK-PARALLELE-SCHALTUNG  
PARALELO TRIANGULO



ZIG-ZAG TRIFASE  
THREE-PHASE ZIG-ZAG  
ZIG-ZAG TRIFASE  
DREIPHASIGEN ZIG-ZAG SCHALTUNG  
ZIG-ZAG TRIFASICA



MONOFASE PARALLELO ZIG-ZAG  
SINGLE PHASE PARALLEL ZIG-ZAG  
MONOPHASE PARALLELE ZIG-ZAG  
EINPHASIGEN ZIG-ZAG PARALLELE SCHALTUNG  
MONOFASE PARALELO ZIG-ZAG



DOPPIO TRIANGOLO  
DOUBLE DELTA  
DOUBLE TRIANGLE  
DOPPEL-DREIECK SCHALTUNG  
DOBLE TRIANGULO

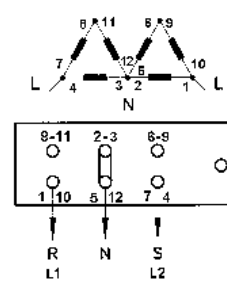


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# 3

COLLEGAMENTI GENERATORI MONOFASI  
CONNECTIONS FOR SINGLEPHASE ALTERNATORS  
CONNECTIONS ALTERNATEURS MONOPHASES  
ANSCHLUSSE DER EINPHASENMASCHINEN  
CONEXION ALTERNADOR MONOFASE

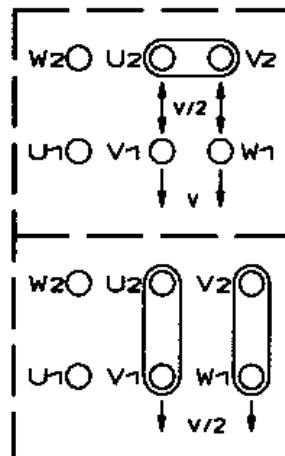


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4

SCHEMA ELETTRICO MONOFASE CON S.R.7/2-G  
SINGLE PHASE ELECTRICAL DIAGRAM WITH S.R.7/2-G  
SCHÉMA ÉLECTRIQUE MONOPHASÉ AVEC S.R.7/2-G  
SCHALTPLAN MONOPHASE MIT S.R.7/2-G  
ESQUEMA ELÉCTRICO MONOFASE CON S.R.7/2-G

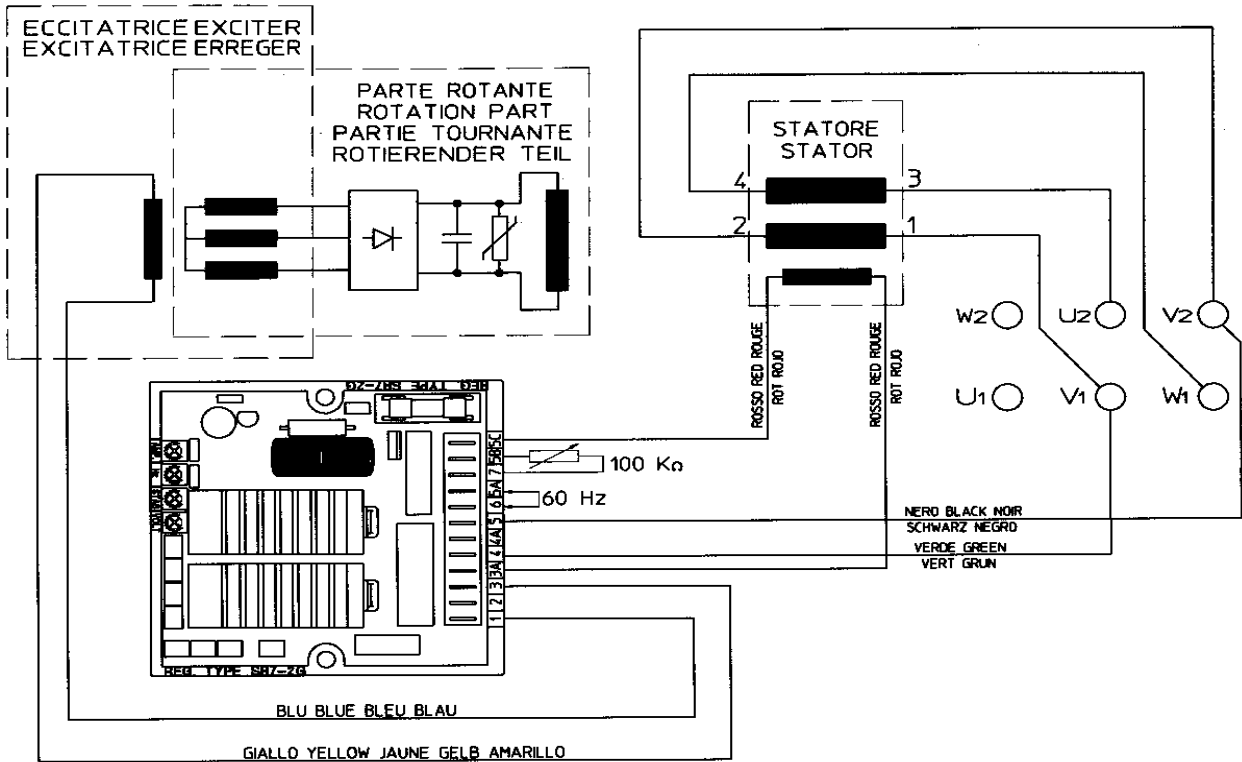
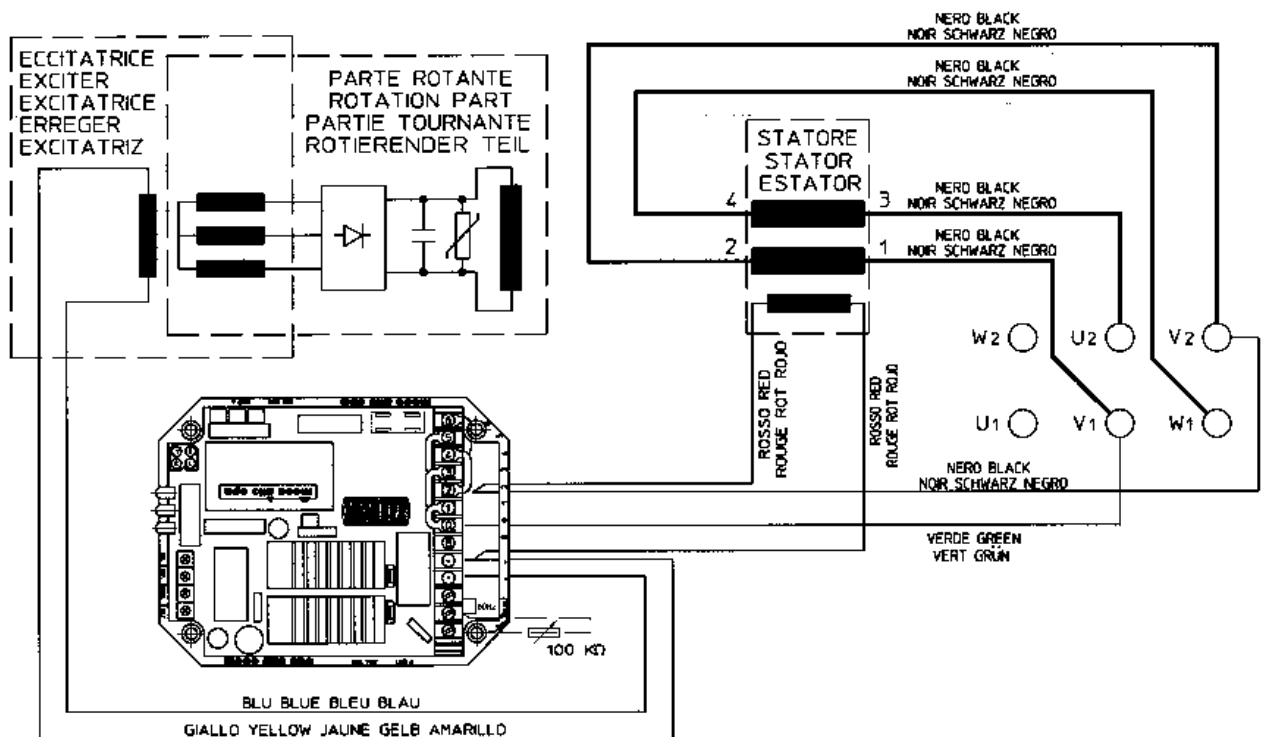


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5

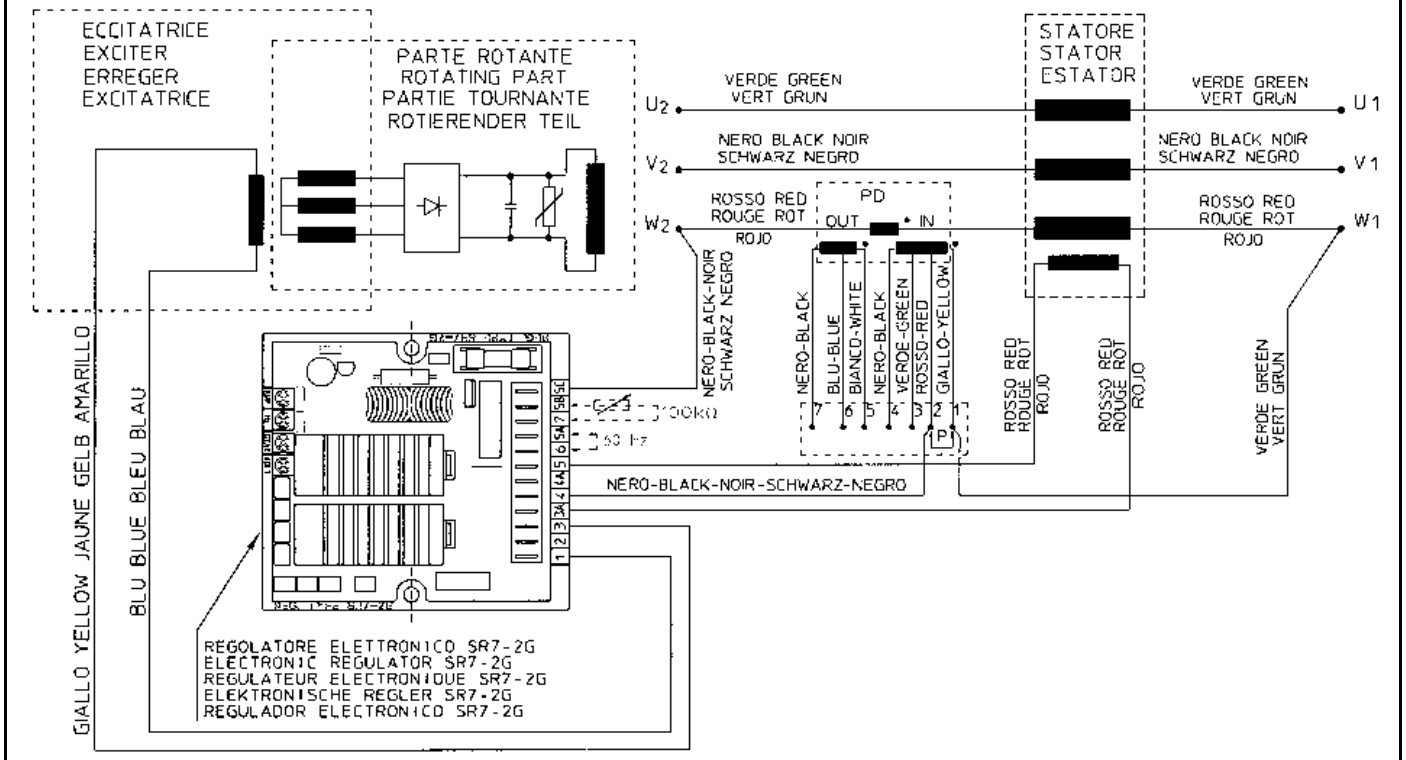
SCHEMA ELETTRICO MONOFASE CON U.V.R.6/1-F  
SINGLE PHASE ELECTRICAL DIAGRAM WITH U.V.R.6/1-F  
SCHÉMA ÉLECTRIQUE MONOPHASÉ AVEC U.V.R.6/1-F  
SCHALTPLAN MONOPHASE MIT U.V.R. 6/1-F  
ESQUEMA ELÉCTRICO MONOFASE CON U.V.R.6/1-F



# 6

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SCHEMA ELETTRICO CON S.R.7/2-G  
ELECTRICAL DIAGRAM WITH S.R.7/2-G  
SCHEMA ELECTRIQUE AVEC S.R.7/2-G  
SCHALTPLAN MIT S.R.7/2-G  
ESQUEMA ELECTRICO CON S.R.7/2-G



# 7

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SCHEMA ELETTRICO CON U.V.R.6/1-F  
ELECTRICAL DIAGRAM WITH U.V.R.6/1-F  
SCHEMA ELECTRIQUE AVEC U.V.R.6/1-F  
SCHALTPLAN ECO MIT U.V.R.6/1-F  
ESQUEMA ELECTRICO CON U.V.R.6/1-F

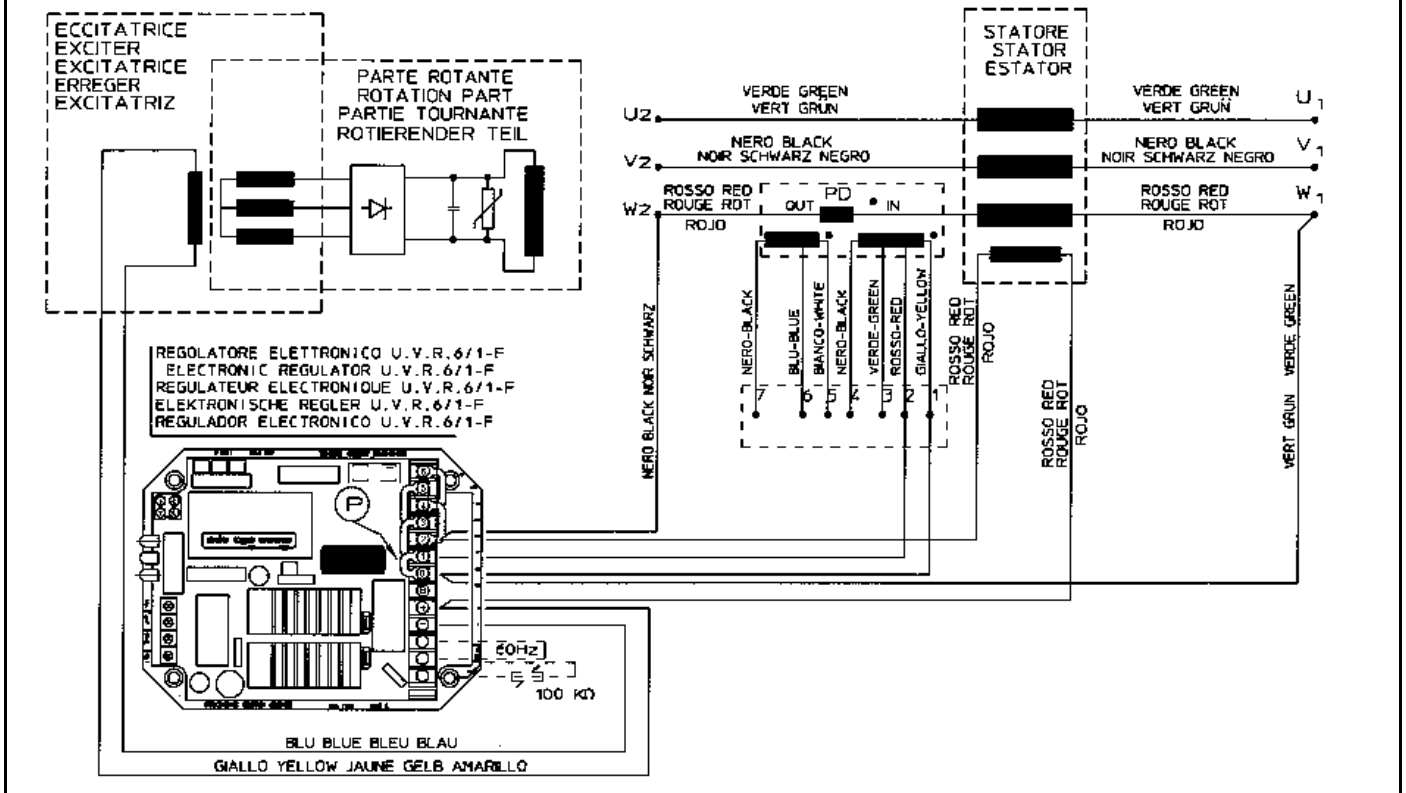




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8

SCHEMA ELETTRICO 12 MORSETTI CON S.R.7/2-G  
12 WIRES ELECTRICAL DIAGRAM WITH S.R.7/2-G  
SCHEMA ELECTRIQUE 12 BORNES AVEC S.R.7/2-G  
SCHALTPLAN MIT 12 KLEMMEN UND S.R.7/2-G  
ESQUEMA ELECTRICO 12 HILOS CON S.R.7/2-G

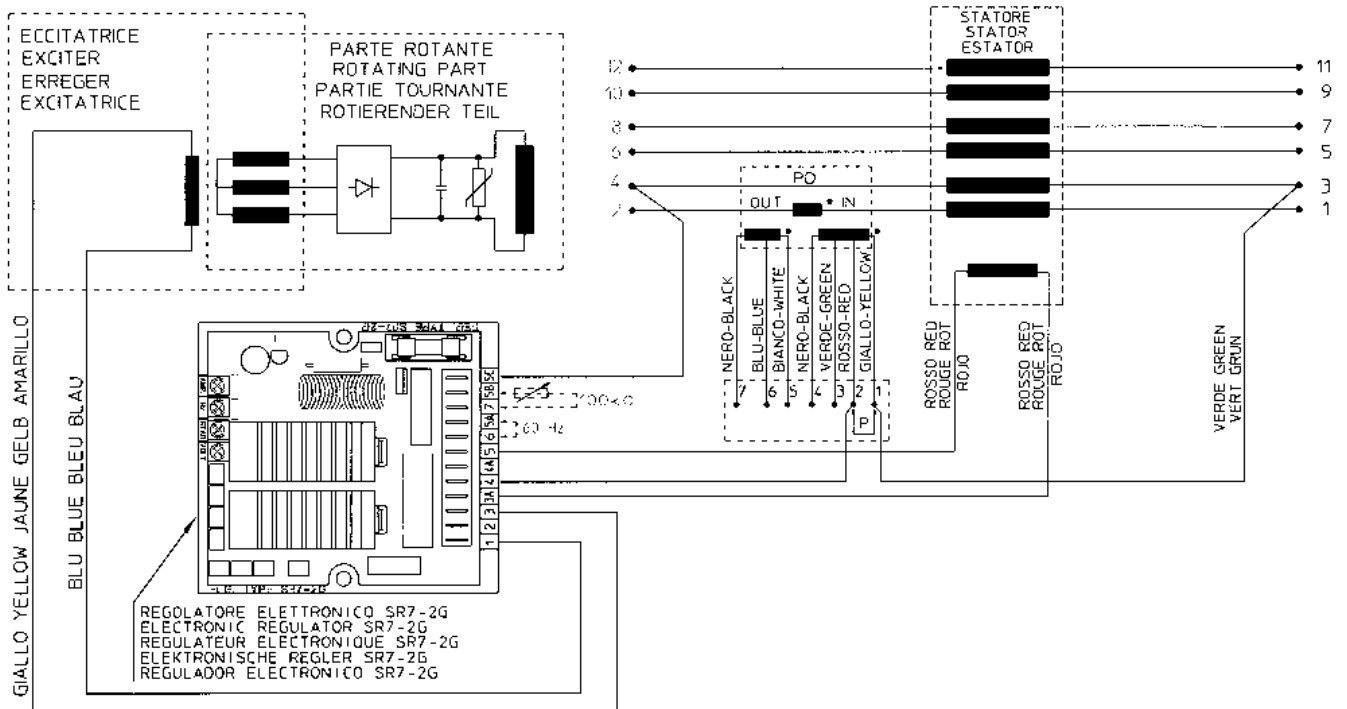


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9

SCHEMA ELETTRICO 12 MORSETTI CON U.V.R.6/1-F  
12 WIRES ELECTRICAL DIAGRAM WITH U.V.R.6/1-F  
SCHEMA ELECTRIQUE 12 BORNES AVEC U.V.R.6/1-F  
SCHALTPLAN MIT 12 KLEMMEN UND U.V.R.6/1-F  
ESQUEMA ELECTRICO 12 HILOS CON U.V.R.6/1-F

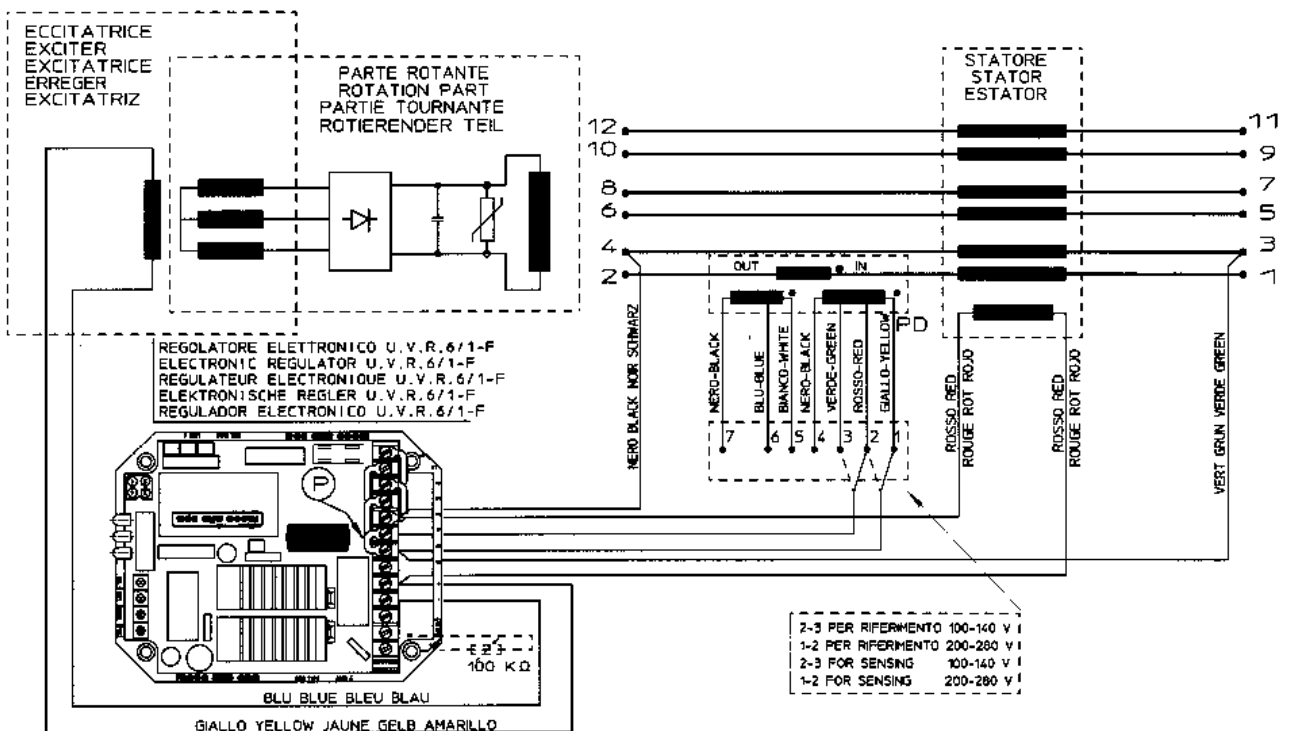


Tavola  
Table  
Abbildung  
Tabla

# 10

SCHEMA ELETTRICO RIFERIMENTO TRIFASE  
ELECTRICAL DIAGRAM WITH THREEPHASE SENSING  
SCHEMA ELECTRIQUE REFERENCE TRIPHASE  
SCHALTPLAN MIT DREIPHASIGEN ISTWERT  
ESQUEMA ELECTRICO CON REFERENCIA TRIFASICA

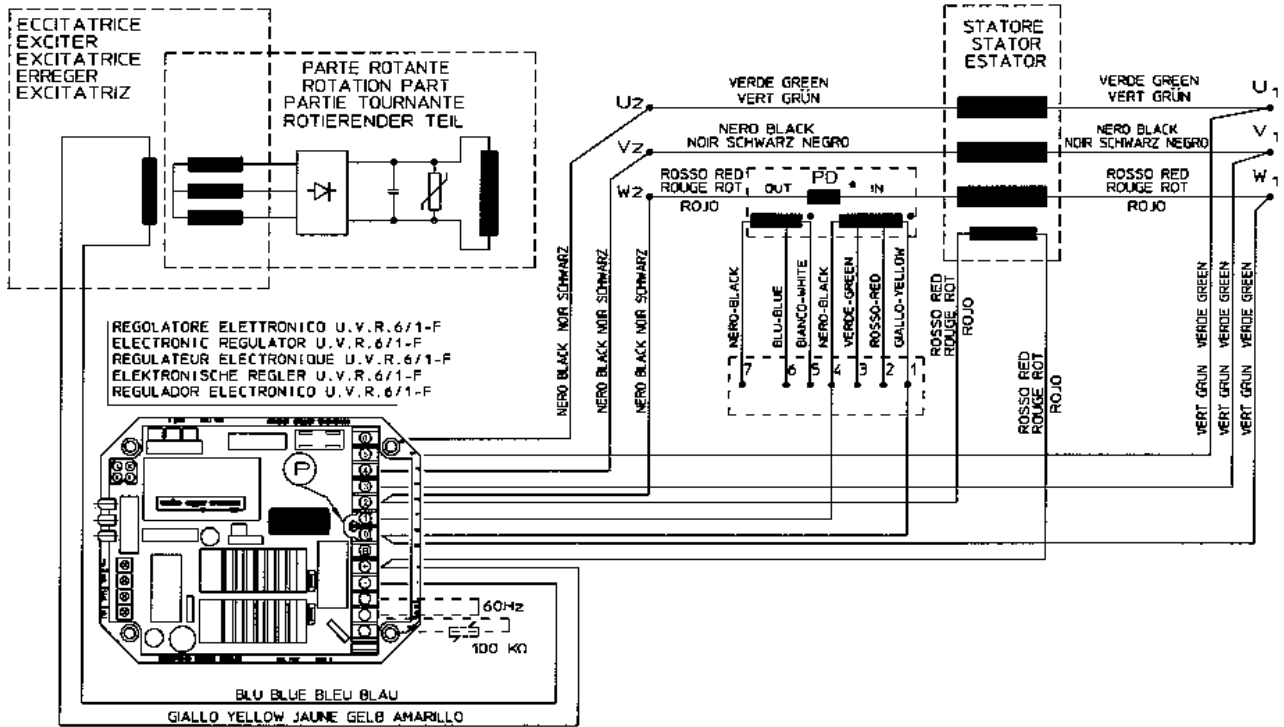


Tavola  
Table  
Abbildung  
Tabla

# 11

SCHEMA ELETTRICO 12 MORSETTI RIFERIMENTO TRIFASE  
12 WIRES ELECTRICAL DIAGRAM WITH THREEPHASE SENSING  
SCHEMA ELECTRIQUE 12 BORNES REFERENCE TRIPHASE  
SCHALTPLAN MIT 12 KLEMMEN UND DREIPHASIGEN ISTWERT  
ESQUEMA ELECTRICO 12 HILOS CON REFERENCIA TRIFASICA

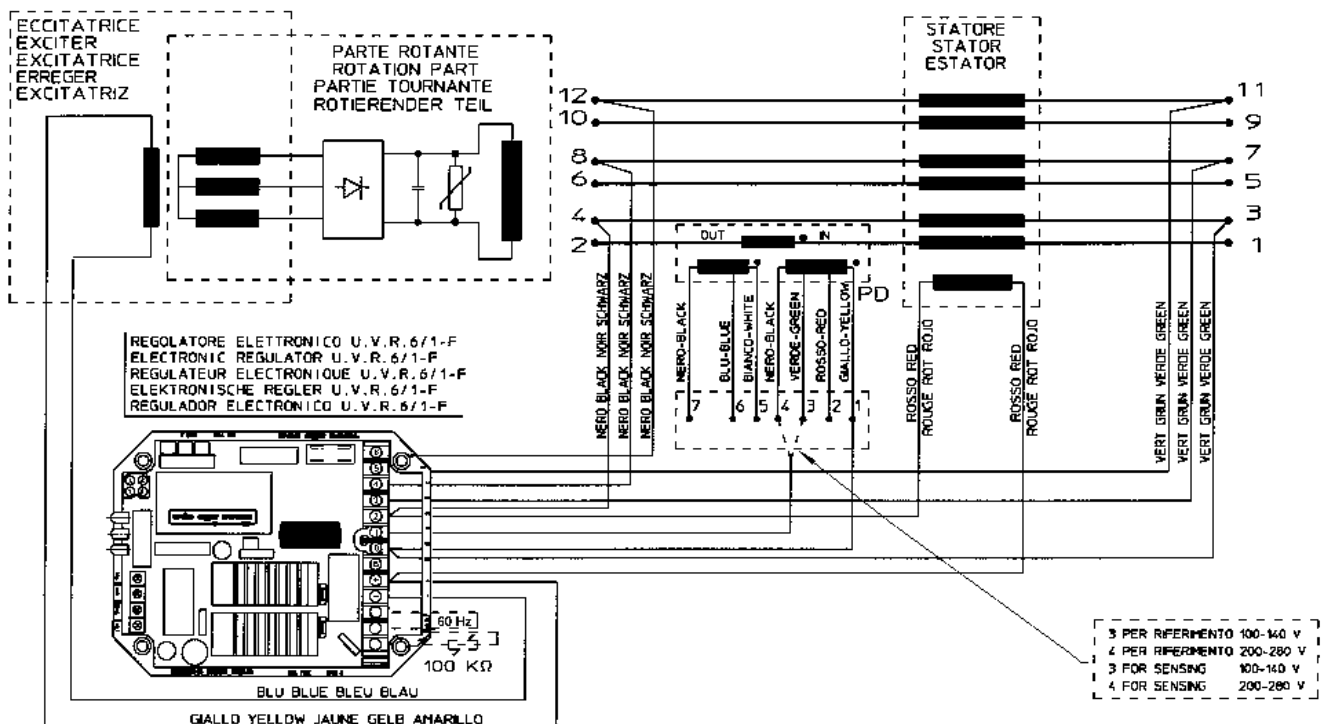


Tavola  
Table  
Abbildung  
Tabla

# 12

TABELLA CUSCINETTI E MANUTENZIONI PERIODICHE  
PERIODIC MAINTENANCE AND BEARING TABLE  
TABLEAU DE MAINTENANCE DES ROUEMENTS  
TABELLE DER LAGER UND DER PERIODISCHEN INSTANDHALTUNG  
TABLA DE MANTENIMIENTO DE LOS COJINETES

Tutti i cuscinetti sono ingrassati in fase di montaggio; grasso impiegato normalmente tipo SKF LGMT2 o corrispondente.

All bearings are greased during assembly; use SKF LGMT2 or equivalent grease for normal operation.

Tous les roulements sont graissés au moment de l'assemblage; utiliser SKF LGMT2 ou équivalent pour operation de maintenance.

Alle Lager werden während der Montage eingefettet; Verwendetes Fett: Typ SKF LGMT2 oder gleichwertiges.

Todos los cojinetes son engrasados en fase de montaje; la grasa normalmente empleada es del tipo SKF LGMT2 o equivalente.

Alternatore tipo Alternator type Type alternateur Generatortyp Alternador tipo	Tipo cuscinetti Bearing type Type roulement Lagertyp Cojinete tipo	
	L.A. D.E. R.A.R.	L.O.A. O.D.E. R.A.V.
NPE 31 - 32	/	6305.2RS/C3*

(\*) Cuscinetti stagni: non sono necessarie manutenzioni per tutto il periodo di funzionamento (circa 30.000 ore).

(\*) Sealed bearings: no maintenance is necessary for their entire working life (approximately 30.000 hours).

(\*) Roulements etanches; aucune maintenance n'est necessaire pour leur fonctionnement (pour approximativement 30.000 heures).

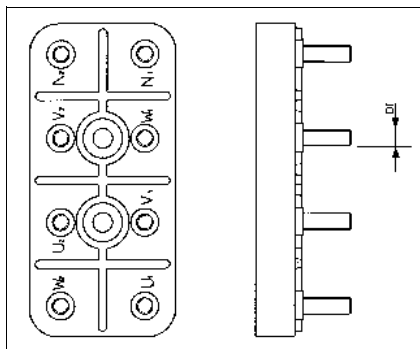
(\*) Dauergeschmierte lager. d.h.;während der gesamten Funktionszeit (etwa 30.000 Studen) ist keinerlei Wartung notwendig.

(\*) Cojinetes sellados; no son necesarios mantenimientos en todo el periodo de funcionamiento (aproximado 30.000 horas).

Tavola  
Table  
Abbildung  
Tabla

# 13

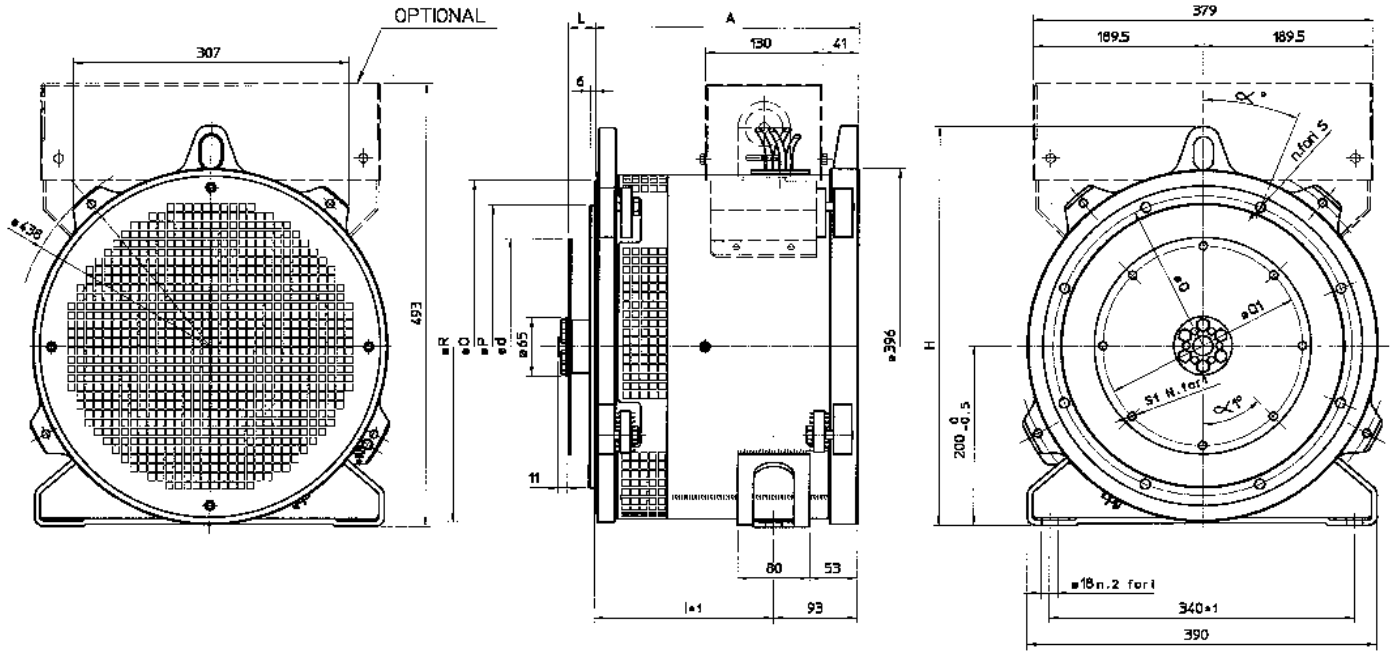
TABELLA COPPIE DI SERRAGGIO PER MORSETTIERE  
TERMINAL BOARD TIGHTENING TORQUE TABLE  
TABLEAU DE COUPLE DE SERRAGE POUR PLANCHETTE A BORNES  
KLEMMENBRETT AUZUGSMOMENT TABELLE  
TABLA PAR DE TORQUE POR PLACA DE BORNES



DIAMETRO DI FILETTATURA Df THREAD DIAMETER Df DE FILETAGE Df GEWINDE DURCHMESSER Df DIAMETRO DE FILETEADO Df	COPPIA DI SERRAGGIO Nm TIGHTENING TORQUE Nm COUPLE DE SERRAGE Nm ANZUGSMOMENT Nm PAR DE TORQUE Nm
M6	6 ± 7%

# NPE 31-32

DISEGNI DI INGOMBRO  
 OVERALL DIMENSIONS  
 ENCOMBREMENT  
 BAUBMESSUNGEN  
 DIMENSIONES EXTERNAS



TIPO / TYPE	A	I
NPE32-A/4 NPE31-A/2	258	165
NPE32-B/4 NPE31-B/2	268	175
NPE32-C/4 NPE31-C/2	278	185
NPE32-D/4 NPE31-D/2	293	200
NPE32-E/4 NPE31-E/2	323	230
NPE32-F/4 NPE31-F/2	343	250

SAE N°	Giunti a dischi Disc coupling Disque de monopulier Scheibenkupplung					
	L	d	Q1	N° fori	S1	α1
6 ½	30,2	215,9	200	6	9	60°
7 ½	30,2	241,3	222,25	8	9	45°
8	62	263,52	244,47	6	11	60°
10	53,8	314,32	295,27	8	11	45°
11 ½	39,6	352,42	333,37	8	11	45°

SAE N°	Flangia / Flange Bride / Flansch						
	R	O	P	Q	N° fori	S	α
5	391	356	314,3	333,4	8	11	22°30'
4	413	403	362	381	12	11	15°
3	453	-	409,6	428,6	12	11	15°

SAE	H
5	443
4	454
3	474

## GARANZIA

**A**  
La Mecc Alte garantisce la buona costruzione e qualità dei propri alternatori per 24 mesi dalla data di spedizione dai propri stabilimenti o filiali.

**B**  
Durante il suddetto periodo la Mecc Alte si impegna a riparare o sostituire (a proprie spese) nella propria sede, quelle parti che si fossero avariate, senza però essere tenuta a risarcimenti di danni diretti o indiretti.

**C**  
La decisione sul riconoscimento o meno della garanzia è riservata esclusivamente alla Mecc Alte previo esame delle parti avariate che dovranno pervenire in porto franco, alla sua sede di Vicenza.

**D**  
Tutte le eventuali spese di viaggio, trasferta, trasporto, mano d'opera per lo smontaggio e rimontaggio dell'alternatore dall'apparecchiatura azionante sono sempre a carico dell'utente.

**E**  
La garanzia decade se durante il periodo predetto, i prodotti fossero:

- 1 immagazzinati in luogo non adatto;
- 2 riparati o modificati da personale non autorizzato dalla Mecc Alte;
- 3 usati o sottoposti a manutenzione non in base alle norme stabilite dalla Mecc Alte;
- 4 sovraccaricati o impiegati in prestazioni diverse da quelle per le quali sono stati forniti.

La garanzia cessa comunque qualora il cliente fosse inadempiente nei pagamenti per qualunque ragione.

## WARRANTY

**A**  
Mecc Alte warrants the good manufacture and quality of all its products for 24 months, starting from the time of shipment from our factories or our branches.

**B**  
During said period Mecc Alte obliges to repair replace at its cost, at its works, all those parts which failed without any other liability of any type, direct or indirect.

**C**  
The decision for warranty approval is Mecc Alte's exclusive right and subject to a previous examination of the failed parts which are to be forwarded fob Mecc Alte Italy for analysis.

**D**  
All the eventual expenses concerning travel, board, transport, and labour for assembly/disassembly of alternator from the drive unit are always at the user's charge.

**E**  
The warranty shall be void if during the above described period the following anomalies should occur:

- 1 inadequate storage;
- 2 repair or modification by unauthorized personnel;
- 3 use or maintenance conditions which do not conform with norms established by Mecc Alte;
- 4 overload or application other than what the product was meant for.

Warranty coverage also expires whenever the client, for whatever reason, is late in payment.

## GARANTIE

**A**  
La société Mecc Alte garantit la bonne construction et qualité de ses produits pour une durée de 24 mois à compter de la date d'expédition de ses usines de fabrication ou filiales.

**B**  
Durant la période indiquée, Mecc Alte s'engage à réparer ou à remplacer (à prix équivalent) dans la société, la partie qui serait endommagée sans toutefois être tenue de prendre en considération les frais directs ou indirects.

**C**  
La décision sur la prise en charge ou non de la garantie est réservée exclusivement à Mecc Alte sur examen préalable des pièces endommagées qui devront parvenir en port Franco à l'usine de Vicenza.

**D**  
Tout les éventuels frais de voyage, transfert, transport, main d'oeuvre pour le démontage de l'alternateur sont toujours à la charge de l'utilisateur.

**E**  
La garantie ne s'applique pas si durant la période indiquée il y a:

- 1 emmagasinement dans un local non adapté;
- 2 réparations ou modifications personnelles non autorisées par Mecc Alte;
- 3 usage et manutentions non conformes aux normes établies par Mecc Alte;
- 4 surcharges et emplois des fonctions différentes de celles pour lequel ils sont fournis.

Il est bien évident que la garantie ne s'applique que sur le matériel payé en totalité.

## GARANTIE

**A**  
Die Firma Mecc Alte gibt 24 Monate Garantie ab dem Zeitpunkt der Auslieferung vom Stammhaus oder einer ihrer Filialen auf die einwandfreie Konstruktion und Qualität ihrer Generatoren.

**B**  
Während der genannten Periode repariert oder ersetzt Mecc Alte zu seinen Kosten alle fehlerhaften Teile, ohne Rücksicht ob direkt oder indirekt.

**C**  
Mecc Alte behält sich das Recht vor, die fehlerhaften Teile frei Mecc Alte Vicenza zurückzufordern, zur Schadensuntersuchung

**D**  
Alle eventuellen Kosten wie Transport, Fahrtkosten, Arbeitslohn für De- und Montage gehen zu Lasten des Kunden.

**E**  
Die Garantie in O.A. Zeit wird für nachstehende Faktoren ausgeschlossen:

- 1 nicht korrekte Lagerung;
- 2 Reparatur oder Modifizierung durch nicht von Mecc Alte autorisiertem Personal;
- 3 Gebrauch oder Einsatz bei Konditionen die nicht der Norm von Mecc Alte entsprechen;
- 4 Überlast Gebrauch oder Montage anders als wofür das Produkt bestimmt ist.

Die Garantie erlischt auch, wenn aus welchen Gründen auch immer, der Kunde in Zahlung überfällig ist.

## GARANTIA

**A**  
Mecc alte garantiza la buena construcción y calidad de los propios productos por 24 meses desde la fecha de salida de sus fabricas o de sus filiales.

**B**  
Durante dicho periodo la Mecc Alte se obliga a reparar o sustituir a su cargo, en su establecimiento todas aquellas piezas que hubieran sido averiadas, sin hacerse cargo de otro tipo de danos, directos o indirectos.

**C**  
La decisión acerca del reconocimiento de garantía esta reservada exclusivamente a la Mecc Alte, previo examen de las partes averiadas que deberan permanecer en puerto franco o en su propia sede de Vicenza.

**D**  
Todos los eventuales gastos de transporte, viaje, transferencia o mano de obra, para el desmontaje y nuevo montaje, del alternador o elemento accionante seran siempre a cargo del usuario.

**E**  
La garantía caduca si durante el periodo descrito se produjeran las siguientes anomalías:

- 1 almacenaje en lugar inadecuado;
- 2 reparacion o modificacion por personal no autorizado por Mecc Alte;
- 3 utilizacion o condiciones de manutencion que contravengan las normas establecidas por Mecc Alte;
- 4 sobrecarga o empleo en prestaciones distintas de aquellas para las que ha estado suministrado.

La garantía cesa igualmente en el momento que el cliente sea moroso de pago, cualquiera que sea la razón.

La lista degli indirizzi è aggiornata a :  
The list of addresses was up-dated on :  
La liste des adresses a été mise à jour le :  
Die Adressenliste wurde erstellt am :  
La lista de las direcciones ha sido puesta a  
día en fecha :

08/02/2010

Per verifiche successive, pregasi consultare il sito web : [www.meccalte.com](http://www.meccalte.com)  
To check recent changes, kindly consult our web site: [www.meccalte.com](http://www.meccalte.com)  
Veuillez consulter [www.meccalte.com](http://www.meccalte.com) pour les mises à jours regulieres.  
Aktualisierungen finden Sie unter: [www.meccalte.com](http://www.meccalte.com)  
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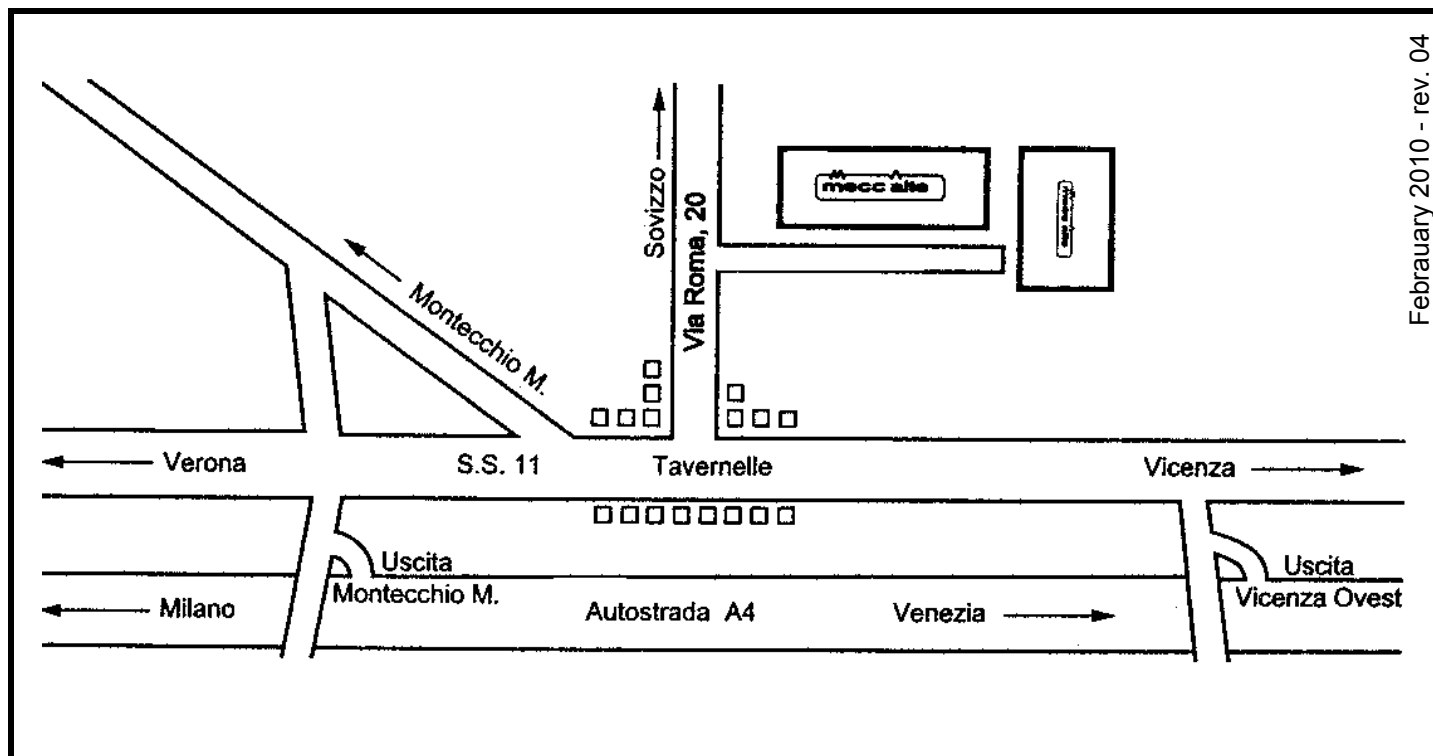
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# Engine Manual

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Code No. EG821-8916-7

WG  
972-E4

**OPERATOR'S MANUAL  
KUBOTA LIQUID COOLED GASOLINE/LPG/CNG ENGINE**

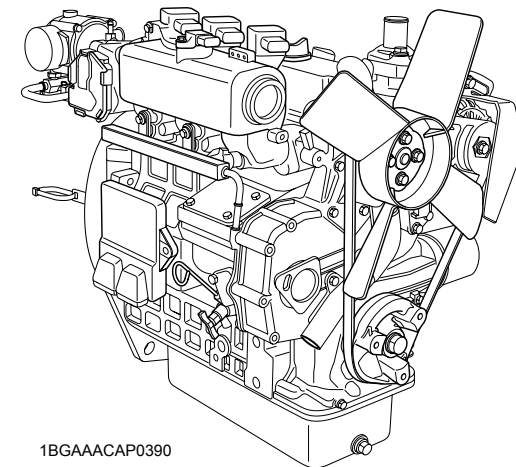
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**MANUAL DE INSTRUCCIONES  
MOTOR KUBOTA DE GASOLINA/GPL/GNC REFRIGERADO POR LÍQUIDO**

**WG972-E4**



1BGAACAP0390

*READ AND SAVE THIS BOOK  
MANUEL A LIRE ET A CONSERVER  
DIESE ANLEITUNG BITTE SORGFÄLTIG DURCHLESEN  
UND GRIFFBEREIT AUFBEWAHREN  
LEGGETE E CONSERVATE QUESTO MANUALE  
LEAN Y CONSERVEN ESTE MANUAL*

THE WG972-E4 ENGINE CONFORMS TO U.S. EPA PHASE 3 EXHAUST REGULATION AND CALIFORNIA EXHAUST EMISSION REGULATIONS FOR OFF-ROAD LARGE SI ENGINES.

- EMISSION COMPLIANCE PERIOD:1000 HOURS
- CARB EMISSIONS DURABILITY PERIOD: EXTENDED

California Proposition 65

**⚠ WARNING ⚠**

Engine exhaust, some of its constituents, certain vehicle components and fluids, contain or emit chemicals known to the State of California to cause cancer and birth defects or other reproductive harm.

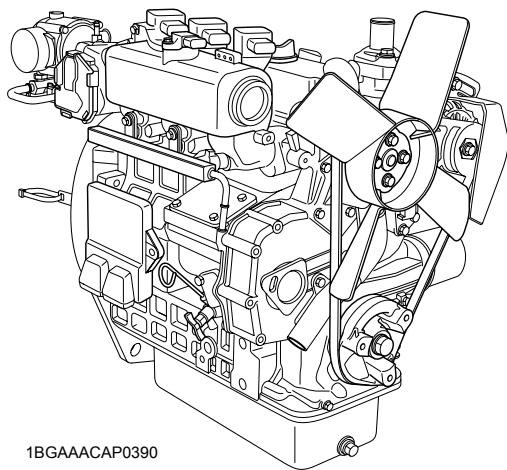
# OPERATOR'S MANUAL

ENGLISH

# KUBOTA

## LIQUID COOLED GASOLINE/LPG/CNG ENGINE

MODEL WG972-E4



1BGAAACAP0390

*READ AND SAVE THIS BOOK*

**Kubota**



# FOREWORD

You are now the proud owner of a KUBOTA Engine. This engine is a product of KUBOTA quality engineering and manufacturing. It is made of fine materials and under a rigid quality control system. It will give you long, satisfactory service. To obtain the best use of your engine, please read this manual carefully. It will help you become familiar with the operation of the engine and contains many helpful hints about engine maintenance. It is KUBOTA's policy to utilize as quickly as possible every advance in our research. The immediate use of new techniques in the manufacture of products may cause some small parts of this manual to be outdated. KUBOTA distributors and dealers will have the most up-to-date information. Please do not hesitate to consult with them.



## SAFETY FIRST

This symbol, the industry's "Safety Alert Symbol", is used throughout this manual and on labels on the machine itself to warn of the possibility of personal injury. Read these instructions carefully. It is essential that you read the instructions and safety regulations before you attempt to assemble or use this unit.



**DANGER :** Indicates an imminently hazardous situation which, if not avoided, will result in death or serious injury.



**WARNING :** Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



**CAUTION :** Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury.

**IMPORTANT :** Indicates that equipment or property damage could result if instructions are not followed.

**NOTE :** Gives helpful information.

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# SAFE OPERATION

Careful operation is your best assurance against an accident. Read and understand this section carefully before operating the engine. All operators, no matter how much experience they may have, should read this and other related manuals before operating the engine or any equipment attached to it. It is the owner's obligation to provide all operators with this information and instruct them on safe operation.

Be sure to observe the following for safe operation.

## 1. OBSERVE SAFETY INSTRUCTIONS

- Read and understand carefully this "OPERATOR'S MANUAL" and "LABELS ON THE ENGINE" before attempting to start and operate the engine.
- Learn how to operate and work safely. Know your equipment and its limitations. Always keep the engine in good condition.
- Before allowing other people to use your engine, explain how to operate and have them read this manual before operation.
- DO NOT modify the engine. UNAUTHORIZED MODIFICATIONS to the engine may impair the function and/or safety and affect engine life. If the engine does not perform properly, consult your local Kubota Engine Distributor first.



1A9A9AAA9008R

## 2. WEAR SAFE CLOTHING AND PERSONAL PROTECTIVE EQUIPMENT (PPE)

- DO NOT wear loose, torn or bulky clothing around the machine that may catch on working controls and projections or into fans, pulleys and other moving parts causing personal injury.
- Use additional safety items-PPE, e.g. hard hat, safety protection, safety goggles, gloves, etc., as appropriate or required.
- DO NOT operate the machine or any equipment attached to it while under the influence of alcohol, medication, or other drugs, or while fatigued.
- DO NOT wear radio or music headphones while operating the engine.



1AE9AAAAP0130

### 3. CHECK BEFORE STARTING & OPERATING THE ENGINE

- Be sure to inspect the engine before operation. Do not operate the engine if there is something wrong with it. Repair it immediately.
- Ensure all guards and shields are in place before operating the engine. Replace any that are damaged or missing.
- Check to see that you and others are a safe distance from the engine before starting.
- Always keep the engine at least 3 feet (1 meter) away from buildings and other facilities.
- DO NOT allow children or livestock to approach the machine while the engine is running.
- DO NOT start the engine by shorting across starter terminals.



### 4. KEEP THE ENGINE AND SURROUNDINGS CLEAN

- Be sure to stop the engine before cleaning.
- Keep the engine clean and free of accumulated dirt, grease and trash to avoid a fire. Store flammable fluids in proper containers and cabinets away from sparks and heat.
- Check for and repair leaks immediately.
- DO NOT stop the engine without idling; Allow the engine to cool down, first. Keep the engine idling for about 5 minutes before stopping unless there is a safety problem that requires immediate shut down.



### 5. SAFE HANDLING OF FUEL AND LUBRICANTS -KEEP AWAY FROM FIRE

- Always stop the engine before refueling and/or lubricating.
- DO NOT smoke or allow flames or sparks in your work area. Fuel is extremely flammable and explosive under certain conditions.
- Refuel at a well ventilated and open place. When fuel and/or lubricants are spilled, refuel after letting the engine cool down.
- Do not use unapproved containers e.g. buckets, bottles, jars. Use approved fuel storage containers and dispensers.



- If running the engine on LPG, use the standard LPG fuel recommended by KUBOTA. The use of other fuel may cause a hazardous or dangerous condition.
- LPG fuel in the gaseous state is heavier than air and will settle in low areas, this may be hazardous. Please follow all operator's manual instructions when changing the fuel tank and servicing the fuel system.

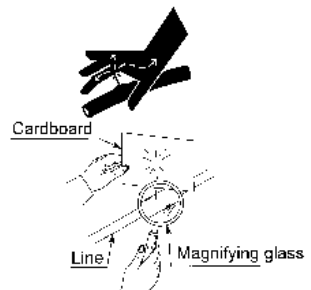
## 6. EXHAUST GASES & FIRE PREVENTION

- Engine exhaust fumes can be very harmful if allowed to accumulate. Be sure to run the engine in a well ventilated location and where there are no people or livestock near the engine.
- The exhaust gas from the muffler is very hot. To prevent a fire, do not expose dry grass, mowed grass, oil or any other combustible materials to exhaust gas. Keep the engine and muffler clean at all times.
- To avoid a fire, be alert for leaks of flammable substances from hoses and lines. Be sure to check for leaks from hoses or pipes, such as fuel and hydraulic fluid by following the maintenance check list.
- To avoid a fire, do not short across power cables and wires. Check to see that all power cables and wirings are in good condition. Keep all electrical connections clean. Bare wire or frayed insulation can cause a dangerous electrical shock and personal injury.



## 7. ESCAPING FLUID

- Relieve all pressure in the air, the oil and the cooling systems before disconnecting any lines, fittings or related items.
- Be cautious of possible pressure relief when disconnecting any device from a pressurized system that utilizes pressure. DO NOT check for pressure leaks with your hand. High pressure oil or fuel can cause personal injury.
- Escaping fluid under pressure has sufficient force to penetrate skin causing serious personal injury.
- Fluid escaping from pinholes may be invisible. Use a piece of cardboard or wood to search for suspected leaks: do not use hands and body. Use safety goggles or other eye protection when checking for leaks.
- If injured by escaping fluid, see a medical doctor immediately. This fluid can produce gangrene or severe allergic reaction.



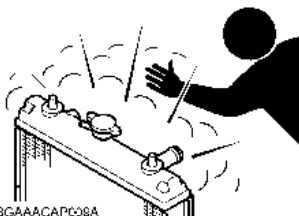
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## 8. CAUTIONS AGAINST BURNS & BATTERY EXPLOSION

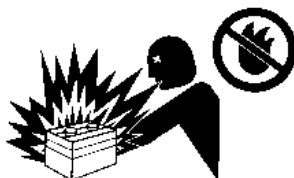
- To avoid burns, be cautious of hot components, e.g. muffler, muffler cover, radiator, hoses, engine body, coolants, engine oil, etc. during operation and after the engine has been shut off.
- DO NOT remove the radiator cap while the engine is running or immediately after stopping. Otherwise hot water will spout out from the radiator. Wait until the radiator is completely cool to the touch before removing the cap. Wear safety goggles.
- Be sure to close the coolant drain valve, secure the pressure cap, and fasten the pipe band before operating. If these parts are taken off, or loosened, it will result in serious personal injury.
- The battery presents an explosive hazard. When the battery is being charged, hydrogen and oxygen gases are extremely explosive.
- DO NOT use or charge the battery if its fluid level is below the LOWER mark. Otherwise, the component parts may deteriorate earlier than expected, which may shorten the service life or cause an explosion. Immediately, add distilled water until the fluid level is between the UPPER and LOWER marks.
- Keep sparks and open flames away from the battery, especially during charging. DO NOT strike a match near the battery.
- DO NOT check the battery charge by placing a metal object across the terminals. Use a voltmeter or hydrometer.
- DO NOT charge a frozen battery. There is a risk of explosion. When frozen, warm the battery up to at least 16°C (61°F).



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## 9. KEEP HANDS AND BODY AWAY FROM ROTATING PARTS

- Be sure to stop the engine before checking or adjusting the belt tension and cooling fan.
- Keep your hands and body away from rotating parts, such as the cooling fan, V-belt, fan drive pulley or flywheel. Contact with rotating parts can cause severe personal injury.
- DO NOT run the engine without safety guards. Install safety guards securely before operation.



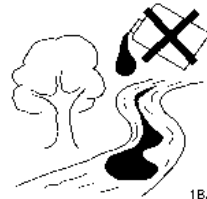
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## 10. ANTI-FREEZE & DISPOSAL OF FLUIDS

- Anti-freeze is poisonous. If it is swallowed, seek immediate medical help. Do NOT make a person throw up unless told to do so by poison control or a health care professional. Use standard first aid and CPR for signs of shock or cardiac arrest. Call your local Poison Control Center or your local emergency number for further assistance.
- Wear rubber gloves to avoid personal injury, when you treat anti-freeze. In case of contact with skin, wash it off immediately.
- DO NOT mix different types of Anti-freeze. The mixture can produce a chemical reaction causing harmful substances. Use approved or genuine KUBOTA Anti-freeze.
- Be mindful of the environment and the ecology. Before draining any fluids, determine the correct way to dispose of them. Observe the relevant environmental protection regulations when disposing of oil, fuel, coolant, brake fluid, filters and batteries.
- When draining fluids from the engine, place a suitable container underneath the engine body.
- DO NOT pour waste onto the ground, down a drain, or into any water source. Dispose of waste fluids according to environmental regulations.



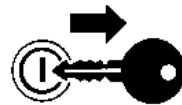
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## 11. CONDUCTING SAFETY CHECKS & MAINTENANCE

- When inspecting the engine or servicing, place the engine on a large flat surface. DO NOT work on anything that is supported ONLY by lift jacks or a hoist. Always use blocks or the correct stands to support the engine before servicing.
- Disconnect the battery from the engine before conducting service. Put a "DO NOT OPERATE!" tag on the key switch to avoid accidental starting.
- To avoid sparks from an accidental short circuit always disconnect the battery's ground cable (-) first and reconnect it last.
- Be sure to stop the engine and remove the key when conducting daily and periodic maintenance, service and cleaning.
- Check or conduct maintenance after the engine, coolant, muffler, or muffler cover have cooled off completely.
- Always use the appropriate tools and fixtures. Verify that they are in good condition before performing any service work. Make sure you understand how to use them before service.
- Use ONLY correct engine barring techniques for manually rotating the engine. DO NOT attempt to rotate the engine by pulling or prying on the cooling fan and V-belt. This practice can cause serious personal injury or premature damage to the cooling fan and belt.

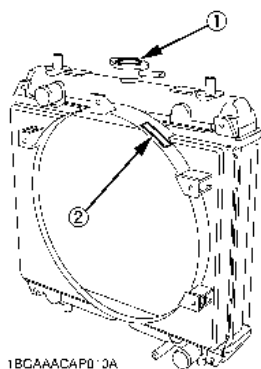


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- Replace fuel pipes with their hose clamps every year or earlier whether they are damaged or not. They are made of rubber and age gradually.
- Replace lubricant pipes with their hose clamps every 2 years or earlier whether they are damaged or not. They are made of rubber and age gradually.
- When servicing is performed together by two or more persons, take care to perform all work safely.
- Keep a first aid kit and fire extinguisher handy at all times.

## 12. WARNING AND CAUTION LABELS



1BGAACAAP03A

- ① Part No. 19077-8724-1 or  
(55mm in diameter)  
16667-8724-1  
(37mm in diameter)



1ABACAAAP036K

- ② Part No. TA040-4957-1  
Do not get your hands close  
to engine fan and fan belt.



1AGAMAAAP262C

## 13. CARE OF WARNING AND CAUTION LABELS

1. Keep warning and caution labels clean and free from obstructing material.
2. Clean warning and caution labels with soap and water, dry with a soft cloth.
3. Replace damaged or missing warning and caution labels with new labels from your local KUBOTA dealer.
4. If a component with warning and caution label(s) affixed is replaced with a new part, make sure the new label(s) is (are) attached in the same location(s) as the replaced component.
5. Mount new warning and caution labels by applying to a clean dry surface and pressing any bubbles to the outside edge.

# SERVICING OF THE ENGINE

Your dealer is interested in your new engine and has the desire to help you get the most value from it. After reading this manual thoroughly, you will find that you can do some of the regular maintenance yourself.

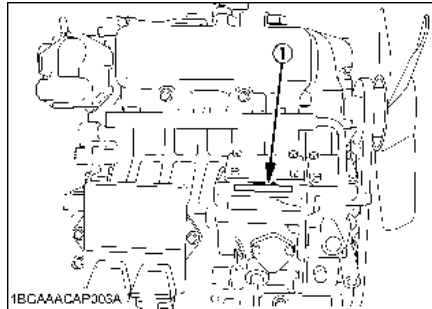
However, when in need of parts or major service, be sure to see your KUBOTA dealer.

For service, contact the KUBOTA Dealership from which you purchased your engine or your local KUBOTA dealer.

When in need of parts, be prepared to give your dealer the engine serial number.

Locate the serial number now and record them in the space provided.

	Type	Serial No.
Engine		
Date of Purchase		
Name of Dealer		
(To be filled in by purchaser)		



(1) Engine serial number

# IMPORTANT INFORMATION OF EMISSION REGULATION

To conform to U.S. EPA Phase 3 and CARB LSI (Large SI) emission regulations, the following standards must be followed before using the WG972-E4 engine.

## 1. EXHAUST SYSTEM

THE WG972-E4 ENGINE MUST USE THE BELOW CATALYTIC PARTS, AND EXHAUST BACK PRESSURE OF THE EXHAUST SYSTEM MUST BE WITHIN THE BELOW VALUES;

GENUINE PART	PART NO.
CATALYTIC MUFFLER	EG821-1211-△
CATALYTIC CONVERTER	EG821-1221-△

WOT, 3600 rpm	RECOMMENDATION EXHAUST BACK PRESSURE
	19.8 kPa (148.5 mmHg) / 3600 rpm

REFER TO INSTALLATION INSTRUCTIONS FOR FURTHER INFORMATION.

**Any modifications to the fuel system or any adjustments made on this engine will cause this engine to be in non-compliance with emission regulations.**

## 2. KUBOTA RECOMMENDED GASEOUS FUEL SPECIFICATIONS

### (1) [LPG : WG972-GL /WG972-L]

- Commercial Propane Gas only.
- Equivalent to Propane HD-5 of GPA\* standards.

C <sub>3</sub> H <sub>8</sub>	C <sub>3</sub> H <sub>6</sub>	C <sub>4</sub> H <sub>10</sub>	Others	
≥90%	≤5%	≤2.5%	---	(vol %)

\*GPA means Gas Processors Association (U.S.A)

### (2) [CNG : WG972-N]

- Compressed Natural Gas only.
- Consult KUBOTA for further info of fuel used.

## 3. LPG or CNG REGULATOR WITH VAPORIZER (WG972-GL, WG972-L, WG972-N)

When operating WG972-GL, WG972-L, WG972-N on gaseous fuel, only a KUBOTA GENUINE REGULATOR KIT can be used.

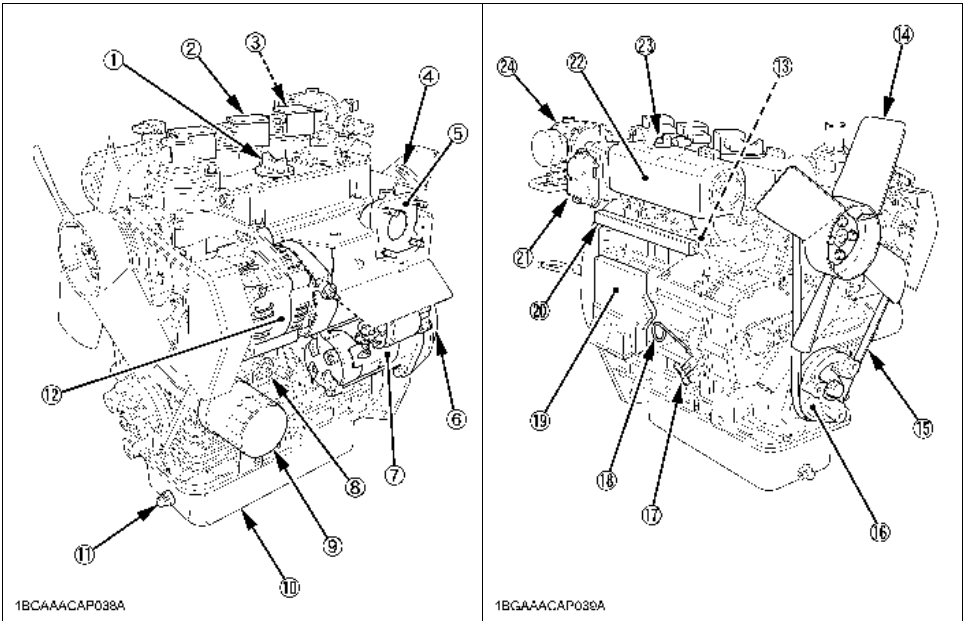
Only this regulator can be installed by an authorized KUBOTA DISTRIBUTOR or the manufacturer of the equipment in which this engine is used.

## 4. PURGE PORT

Kubota prepared the purge port on the air-cleaner flange (WG972-G) and gas mixer (WG972-GL). You should use this purge port to combust fuel vapors vented from the fuel tank.

CONSULT YOUR LOCAL KUBOTA DEALER FOR FURTHER INFORMATION.

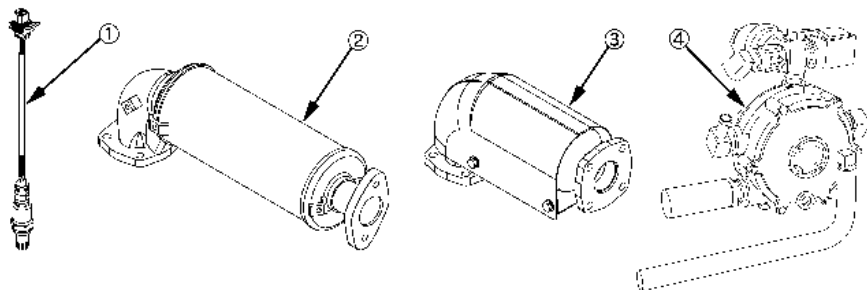
# NAMES OF PARTS



Ref. No.	Part Name	Type				Ref. No.	Part Name	Type			
		G	GL	L	N			G	GL	L	N
(1)	Oil filler plug	○	○	○	○	(13)	Injector	○	○	---	---
(2)	Ignition coil	○	○	○	○	(14)	Cooling fan	○	○	○	○
(3)	Spark plug	○	○	○	○	(15)	Fan belt	○	○	○	○
(4)	Engine hook	○*1	○	○	○	(16)	Fan drive pulley	○	○	○	○
(5)	Exhaust manifold	○	○	○	○	(17)	Coolant drain cock	○	○	○	○
(6)	Flywheel	○	○	○	○	(18)	Oil level gauge	○	○	○	○
(7)	Starter	○	○	○	○	(19)	ECU (Engine Control Unit)	○	○	○	○
(8)	Oil pressure switch	○	○	○	○	(20)	Fuel rail	○	○	---	---
(9)	Oil filter cartridge	○	○	○	○	(21)	Electronic control throttle	○	○	○	○
(10)	Oil pan	○	○	○	○	(22)	Intake manifold	○	○	○	○
(11)	Oil drain plug	○	○	○	○	(23)	T-map sensor	○	○	○	○
(12)	Alternator	○	○	○	○	(24)	Gas mixer	---	○	○	○

G Type : WG972-G, GL Type : WG972-GL, L Type : WG972-L, N type : WG972-N

\*1 : Other parts than the figure.



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Ref. No.	Part Name	Type			
		G	GL	L	N
(1)	Sensor (O2)	○	○	○	○
(2)	Catalytic muffler	○	○	○	○
(3)	Catalytic converter	○	○	○	○
(4)	Gas regulator	---	○	○	○

G Type : WG972-G, GL Type : WG972-GL, L Type : WG972-L, N type : WG972-N

# PRE-OPERATION CHECK

## BREAK-IN

During the engine break-in period, observe the following by all means:

1. Change engine oil and oil filter cartridge after the first 50 hours of operation. (See "ENGINE OIL" in "PERIODIC SERVICE" section.)
2. When ambient temperature is low, operate the machine after the engine has been completely warmed up.

## DAILY CHECK

To prevent trouble from occurring, it is important to know the conditions of the engine well. Check it before starting.



### WARNING

To avoid personal injury or death:

- Be sure to install shields and safeguards attached to the engine when operating.
- Stop the engine at a flat and wide space when checking.
- Keep dust or fuel away from the battery, wiring, muffler and engine to prevent a fire. Check and clear them before operating everyday. Pay attention to the heat of the exhaust pipe or exhaust gas so that it can not ignite trash.

Item		Ref. page
1. Parts which had trouble in previous operation		-
2. By walking around the machine	(1) Oil or water leaks	16 to 20
	(2) Engine oil level and contamination	16, 17
	(3) Amount of fuel	15
	(4) Amount of coolant	18 to 20
	(5) Dust in air cleaner dust cup	21
	(6) Damaged parts and loosened bolts and nuts	-
3. By inserting the key into the starter switch	(1) Proper functions of meters and pilot lamps; no stains on these parts	-
4. By starting the engine	(1) Unusual engine noise	9
	(2) Engine start-up condition	6
	(3) Slow-down and acceleration behavior	9

# OPERATING THE ENGINE

## STARTING THE ENGINE (NORMAL)



### WARNING

To avoid personal injury or death:

- Do not allow children to approach the machine while the engine is running.
- Be sure to install the machine on which the engine is installed, on a flat place.
- Do not run the engine on gradients.
- Do not run the engine in an enclosed area. Exhaust gas can cause air pollution and exhaust gas poisoning.
- Keep your hands away from rotating parts (such as fan, pulley, belt, flywheel etc.) during operation.
- Do not operate the machine while under the influence of alcohol or drugs.
- Do not wear loose, torn or bulky clothing around the machine. It may catch on moving parts or controls, leading to the risk of accident. Use additional safety items, e.g. hard hat, safety boots or shoes, eye and hearing protection, gloves, etc., as appropriate or required.
- Do not wear radio or music headphones while operating engine.
- Check to see if it is safe around the engine before starting.
- Reinstall safeguards and shields securely and clear all maintenance tools when starting the engine after maintenance.

### IMPORTANT :

- When starting the engine after a long storage (of more than 3 months), activate the starter for about 10 seconds to allow oil to reach every engine part.

<b>Gasoline</b>
-----------------

- 1\*. Turn the fuel selector switch\* to the "GASOLINE" position.

**NOTE:**

- \*The step 1 above is for GL type only.
- \*The fuel selector switch is not provided by KUBOTA.

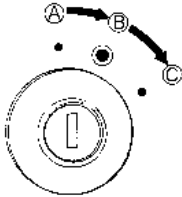
<b>LPG (CNG)</b>
------------------

1. Open the liquid withdrawal valve of the LPG fuel tank (or CNG tank).
- 2\*. Turn the fuel selector switch\* to the "GASEOUS" position.

**NOTE:**

- \*The step 2 above is for GL type only.
- \*The fuel selector switch is not provided by KUBOTA.

3. Insert the key into the starter switch and turn it to the "ON" (⊙) position.



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- (A) "OFF"
- (B) "ON"
- (C) "START"

4. Check to see that MIL (Malfunction Indicator Light) is ON.
5. Turn the key to the "START" position and the starter will begin turning. Release the key immediately, when the engine starts.
6. Check to see that MIL (Malfunction Indicator Light) is OFF. If not, immediately stop the engine and check the cause.
7. Warm up the engine at medium speed running for 3 to 5 minutes.

**IMPORTANT :**

- Be sure to warm up the engine not only in winter but also in other warmer seasons.
- In case of converting the fuel (gasoline ↔ LPG) while running the engine, the engine should be operated with the engine speed high and no-loaded. If you convert the fuel with the engine speed low, the engine will stop.

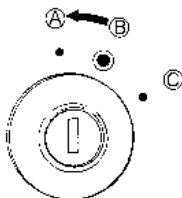


**STOPPING THE ENGINE****Gasoline**

1. Cool down the engine for 2 to 3 minutes.
2. Turn the starter switch to the "OFF" (●) position.
3. Remove the key at the "OFF" position.

**LPG (CNG)**

1. Cool down the engine for 2 to 3 minutes.
2. Turn the starter switch to the "OFF" (●) position.
3. Close the liquid withdrawal valve of the LPG fuel tank (or CNG tank).
4. Remove the key at the "OFF" position.



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- (A) "OFF"  
(B) "ON"  
(C) "START"

## CHECKS DURING OPERATION

While running, make the following checks to see that all parts are working correctly.

### ■ Radiator cooling water (Coolant)



## WARNING

To avoid personal injury or death:

- Do not remove radiator cap until coolant temperature is well below its boiling point. Then loosen cap slightly to the stop position, to relieve any pressure, before removing cap completely.

If the coolant temperature warning lamp lights up or if steam or coolant does not stop squirting from the radiator overflow pipe, turn off the load and **keep the engine idling (COOLING-DOWN) for at least 5 minutes** to let it cool down gradually. Then stop the engine and take the following inspection and servicing.

1. Check to see if the coolant runs short or if there is any coolant leak;
2. Check to see if there is any obstacle around the cooling air inlet or outlet;
3. Check to see if there is any dirt or dust between radiator fins and tube;
4. Check to see if the fan belt is too loose; and
5. Check to see if radiator water pipe is clogged.

### ■ Oil pressure lamp

The lamp lights up to warn the operator that the engine oil pressure has dropped below the prescribed level. If this should happen during operation or should not go off even after the engine is accelerated more than 1000rpm, immediately stop the engine and check the following:

1. Engine oil level (See "ENGINE OIL" in "PERIODIC SERVICE" section.)

### ■ Immediately stop the engine if;

- The engine suddenly slows down or accelerates.
- Unusual noises are suddenly heard.

### ■ If MIL (Malfunction Indicator Light) lights up:

Consult your KUBOTA dealer.

## EMISSION CONTROL SYSTEM

- Operate, use and maintain the engine, including the emission control system in accordance with the instructions provided to the end users, so that the engine's emissions performance is kept within the requirements applicable to the engine's category.
- Do not deliberately tamper, or misuse, the engine emission control system, especially with regard to deactivating or not maintaining an exhaust gas recirculation (EGR) system.
- When a warning indicator lights up, the engine is experiencing trouble, which may also cause problems in the emission control system. Take prompt action and rectify any incorrect operation, use, or maintenance of the emission control system in accordance with the rectification measures. (See "TROUBLESHOOTING" or, where applicable, "OPERATOR WARNING AND INDUCEMENT".)



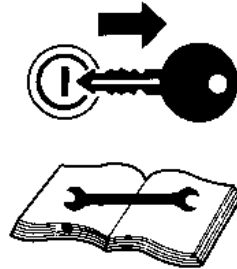
# MAINTENANCE



## WARNING

To avoid personal injury or death:

- Be sure to conduct daily checks, periodic maintenance, refueling or cleaning on a level surface with the engine shut off and remove the key.
- Before allowing other people to use your engine, explain how to operate, and have them read this manual before operation.
- Always use proper tools, that are in good condition. Make sure you understand how to use them, before performing any service work.
- When installing, be sure to tighten all bolts lest they should be loose. Tighten the bolts by the specified torque.
- Do not put any tools on the battery, or battery terminals may short out. Severe burns or fire could result. Detach the battery from the engine before maintenance.
- Do not touch muffler or exhaust pipes while they are hot; Severe burns could result.



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## SERVICE INTERVALS

Non-warranty maintenance, repair, or replacement of the emission control devices and systems should be performed by a qualified repair establishment or individual which has the experience and equipment to perform such work. See the Emission Warranty Statement.

In order to keep your engine in good working conditions, be sure to follow the maintenance / checking schedule given in the table below. (The schedule applies to an engine in use under normal conditions.)

Items		Interval				Remarks	Ref. Page
		Every 8 hours (daily)	Every 50 hours (weekly)	Every 100 hours	Every 200 hours		
Each part	Check / Clean	●					-
Engine oil	Check / Replenish	●					16
	Change		(Initial change)		●		17
Oil filter cartridge	Change		(Initial change)		●		17
Spark plug	Clean			▲			18
	Adjust			▲			18
	Change						-
Air cleaner element	Check	▲					21
	Clean	▲	●				21
	Change						21
Intake pipe / clamp bands	Change						-
Fuel filter	Check			●			-
	Change			▲			-
Fuel tank	Clean					Gasoline line	-
	Check setting	▲			●	Gas line	15
Fuel pipe / clamps (Gasoline line)	Check		●				15
	Change						15
Fuel pipe / clamps (Gas line: Gas tank to Gas mixer)	Check the connector	●					-
	Check fuel leakage		●				15
	Change						-

▲: If necessary

**IMPORTANT:**

\*1 Change more often when operating under dusty conditions.

\*2 If you do not have the proper tools and/or are not mechanically proficient, contact your local KUBOTA dealer.

\*3 This is not necessary to keep the emission related warranty valid.

To ensure the best quality and reliability, use new KUBOTA Genuine parts or their equivalents for repair and replacement, whenever you have maintenance done.

Items		Interval				Remarks	Ref. Page
		Every 1000 hours	Every after 1000 hours	Yearly	Each 2 years		
Each part	Check / Clean						-
Engine oil	Check / Replenish						16
	Change						17
Oil filter cartridge	Change						17
Spark plug	Clean						18
	Adjust						18
	Change	●*3					-
Air cleaner element	Check						21
	Clean						21
	Change			●*1*3			21
Intake pipe / clamp bands	Change				●*3		-
Fuel filter	Check						-
	Change			●			-
Fuel tank	Clean			●		Gasoline line	-
	Check setting					Gas line	15
Fuel pipe / clamps (Gasoline line)	Check						15
	Change			●*3			15
Fuel pipe / clamps (Gas line: Gas tank to Gas mixer)	Check the connector						-
	Check fuel leakage						15
	Change				●*3		-

▲: If necessary

**IMPORTANT:**

\*1 Change more often when operating under dusty conditions.

\*2 If you do not have the proper tools and/or are not mechanically proficient, contact your local KUBOTA dealer.

\*3 This is not necessary to keep the emission related warranty valid.

To ensure the best quality and reliability, use new KUBOTA Genuine parts or their equivalents for repair and replacement, whenever you have maintenance done.

Items		Interval				Remarks	Ref. Page
		Every 8 hours (daily)	Every 50 hours (weekly)	Every 100 hours	Every 200 hours		
Hot water line of gas regulator	Check						15
	Change						-
Gas regulator	Check inner parts*2						-
Breather tube	Change						-
Radiator coolant	Check	●					18
	Change						19
Radiator hoses and clamp bands	Check				●		20
	Change						20
Radiator and water jacket	Clean						20
Fan belt tension	Check			●			25
	Adjust			▲			25
Valve clearance	Adjust						-
Combustion chamber	Clean						-

▲: If necessary

**IMPORTANT:**

\*1 Change more often when operating under dusty conditions.

\*2 If you do not have the proper tools and/or are not mechanically proficient, contact your local KUBOTA dealer.

\*3 This is not necessary to keep the emission related warranty valid.

To ensure the best quality and reliability, use new KUBOTA Genuine parts or their equivalents for repair and replacement, whenever you have maintenance done.

Items		Interval				Remarks	Ref. Page
		Every 1000 hours	Every after 1000 hours	Yearly	Each 2 years		
Hot water line of gas regulator	Check	●					15
	Change				●		-
Gas regulator	Check inner parts*2				●		-
Breather tube	Change				●		-
Radiator coolant	Check						18
	Change			●			19
Radiator hoses and clamp bands	Check						20
	Change				●		20
Radiator and water jacket	Clean			●			20
Fan belt tension	Check						25
	Adjust						25
Valve clearance	Adjust	●*2					-
Combustion chamber	Clean		▲*2				-

▲: If necessary

**IMPORTANT:**

\*1 Change more often when operating under dusty conditions.

\*2 If you do not have the proper tools and/or are not mechanically proficient, contact your local KUBOTA dealer.

\*3 This is not necessary to keep the emission related warranty valid.

To ensure the best quality and reliability, use new KUBOTA Genuine parts or their equivalents for repair and replacement, whenever you have maintenance done.

# PERIODIC SERVICE

## FUEL

Fuel is flammable and can be dangerous. You should handle fuel with care.

### ■ Gasoline

1. Use unleaded gasoline and E10 only.

#### IMPORTANT :

- DO NOT use gasoline blended with methyl alcohol.

### ■ Fuel level check and refueling

1. Check to see that the fuel level is above the lower limit of the fuel level gauge.
2. If the fuel is too low, add fuel to the upper limit. Do not overfill.

### ■ Checking the fuel pipes



## WARNING

To avoid personal injury or death:

- Stop the engine before checking or replacing the fuel pipes. Broken fuel pipes can cause fires.

Check the fuel pipes every 50 hours of operation. When if;

1. If the clamp band is loose, apply oil to the screw of the band, and tighten the band securely.
2. If the fuel pipes, made of rubber, become worn out, replace them and clamp bands every year.
3. If the fuel pipes and clamp bands are found worn or damaged before one year passes, replace or repair them at once.

#### IMPORTANT :

- When the fuel pipes are not installed, plug them at both ends with clean cloth or paper to prevent dirt from entering. Dirt in the pipes can cause fuel injector malfunction.

#### NOTE :

- For the locations of fuel pipes, see "Fuel system diagrams" in "FUEL SYSTEM AND DIAGRAMS" section.

### ■ Gaseous fuel

[LPG : WG972-GL / WG972-L]

1. Use Commercial LPG only.
2. Fuel tank is liquid withdrawal type.

[CNG: WG972-N]

1. Use Commercial CNG only.
2. Consult KUBOTA for further info of fuel used.

#### IMPORTANT :

- Be sure that the fill up valve and the liquid withdrawal valve are closed.
- Be sure that LPG hose or CNG hose is connected with the liquid withdrawal valve.
- Be sure that LPG tank or CNG tank is placed firmly not to move by machine vibration.  
(See "FUEL SYSTEM AND DIAGRAMS" section.)

### ■ LPG or CNG leakage check

[WG972-GL / WG972-L / WG972-N]



## WARNING

To avoid personal injury or death:

- Never test for gas leaks with a flame.

Turn on the gas at low idling rpm and use a soap solution or equivalent to check all connections for leaks between the fuel tank and gas mixer.

Bubbles will indicate a loose connection.

### ■ LPG or CNG fuel tank check

[WG972-GL / WG972-L / WG972-N]

Check that LPG or CNG fuel tank is installed firmly.

Be sure that the fill up valve and liquid withdrawal valve of the LPG or CNG fuel tank can be opened and closed easily.

### ■ LPG or CNG regulator check

[WG972-GL / WG972-L / WG972-N]

Check that the hot water lines are not leaking.

Check that the balance pipe is not damaged.

Do not take the regulator body apart.

### ■ LPG or CNG line check

[WG972-N]

Recommend to install the lock off valve before the high pressure regulator and to install the pressure sensor for checking the CNG tank pressure.

[WG972-GL / WG972-L / WG972-N]

The related parts and the method of installation should be approved for LPG or CNG use and conform to local regulations and all other standards.



## ENGINE OIL

**WARNING**

To avoid personal injury or death:

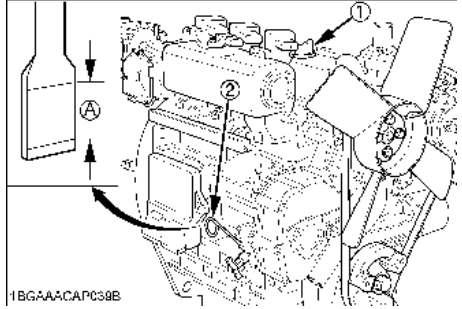
- Be sure to stop the engine before checking and changing the engine oil and the oil filter cartridge.
- Contact with engine oil can damage your skin. Put on gloves when using engine oil. If you come in contact with engine oil, wash it off immediately.

**NOTE :**

- Be sure to inspect the engine, locating it on a level place. If placed on gradients accurately, oil quantity may not be measured.

**Checking oil level and adding engine oil**

1. Check the engine oil level before starting or more than 5 minutes after stopping the engine.
2. Remove the oil level gauge, wipe it clean and reinstall it.
3. Take the oil level gauge out again, and check the oil level.



1BGAAAACAPC39B

- (1) Oil filler plug
- (2) Oil level gauge

[Lower end of oil level gauge]

(A) Engine oil level within this range is proper.

4. If the oil level is too low, remove the oil filler plug, and add new oil to the prescribed level.
5. After adding oil, wait more than 5 minutes and check the oil level again. It takes some time for the oil to drain down to the oil pan.

Engine oil quantity	3.4 L (0.9 U.S.gals.)
---------------------	--------------------------

**IMPORTANT :**

- Engine oil should have properties of API classification SL or higher.
- Change the type of engine oil according to the ambient temperature.

Above 25°C (77°F)	SAE30 or SAE10W-30 SAE15W-40
0°C to 25°C (32°F to 77°F)	SAE20 or SAE10W-30
0°C to -20°C (32°F to -4°F)	SAE10W or SAE10W-30

- When using oil of different brands from the previous one, be sure to drain all the previous oil before adding the new engine oil.

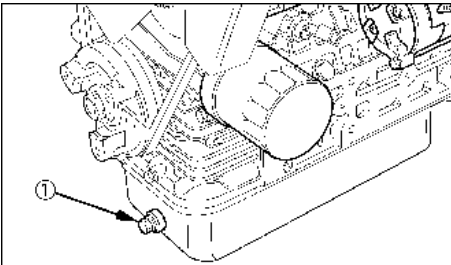
## ■ Changing engine oil



### WARNING

To avoid personal injury or death:

- Be sure to stop the engine before draining engine oil.
  - When draining engine oil, place some container underneath the engine and dispose it according to local regulations.
  - Do not drain oil after running the engine. Allow engine to cool down sufficiently.
1. Change oil after the initial 50 hours of operation and every 200 hours thereafter.
  2. Remove the drain plug at the bottom of the engine, and drain all the old oil. Drain oil will drain easier when the oil is warm.



1BGAAACAP002B

(1) Oil drain plug

3. Replace the drain plug gasket.
4. Add new engine oil up to the upper limit of the oil level gauge.

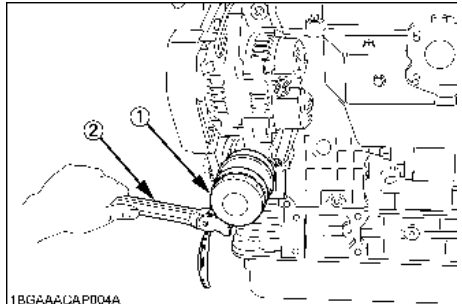
## ■ Replacing the oil filter cartridge



### WARNING

To avoid personal injury or death:

- Be sure to stop the engine before changing the oil filter cartridge.
  - Allow engine to cool down sufficiently, oil can be hot and cause burns.
1. Replace the oil filter cartridge after the initial 50 hours of operation and every 200 hours thereafter.
  2. Remove the old oil filter cartridge with a filter wrench.
  3. Apply a film of oil to the gasket for the new cartridge.
  4. Screw in the cartridge by hand. When the gasket contacts the seal surface, tighten the cartridge enough by hand. Because, if you tighten the cartridge with a wrench, it will be tightened too much.



1BGAAACAP004A

- (1) Oil filter cartridge
- (2) Remove with a filter wrench  
(Tighten with your hand)

5. After the new cartridge has been replaced, the engine oil level normally decreases a little. Thus, run the engine for a while and check for oil leaks through the seal before checking the engine oil level. Add oil if necessary.

#### NOTE :

- Wipe off any oil sticking to the machine completely.

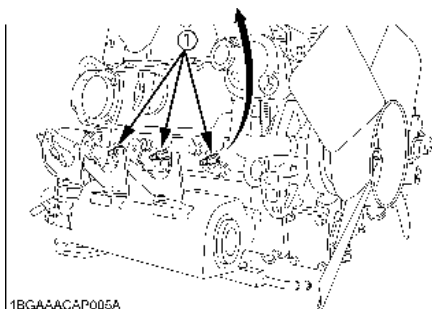
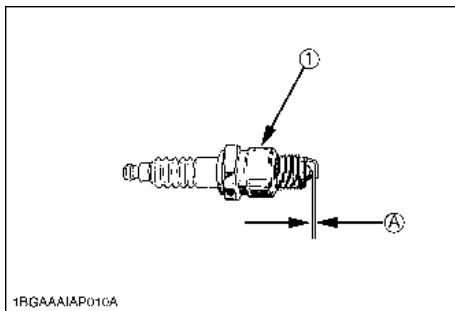
## SPARK PLUG

### ■ Cleaning and adjustment clearance

If the spark plug electrode or its insulator is soiled or is covered with deposited carbon, it may cause engine trouble. The soil, carbon deposits etc. can be brushed off using a wire brush.

After cleaning, be sure to adjust for proper clearance.

- ◆ Tightening Torque  
24.5 to 29.4 N·m (2.5 to 3.0 kgf·m, 18.0 to 21.6 ft·lbs)



(1) Spark plug

(A) Clearance : 0.7 to 0.8 mm  
(0.028 to 0.032 in.)

## RADIATOR

Coolant will last for one day's work if filled all the way up before operation start. Make it a rule to check the coolant level before every operation.

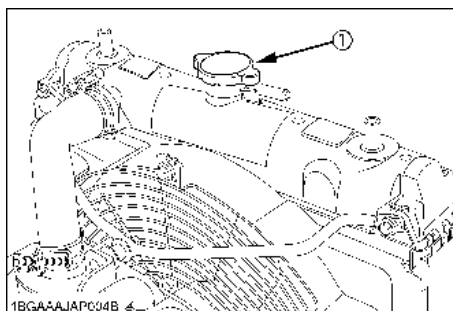
### ⚠ WARNING

To avoid personal injury or death:

- Do not stop the engine suddenly, stop it after about 5 minutes of unloaded idling.
- Work only after letting the engine and radiator cool off completely (more than 30 minutes after it has been stopped).
- Do not remove the radiator cap while coolant is hot. When cool to the touch, rotate cap to the first stop to allow excess pressure to escape. Then remove cap completely. If overheats should occur, steam may gush out from the radiator or recovery tank; Severe burns could result.

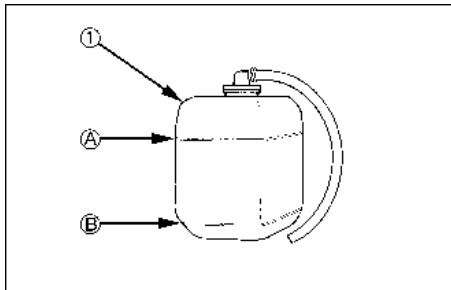
### ■ Checking coolant level, adding coolant

1. Remove the radiator cap, after the engine has completely cooled, and check to see that coolant reaches the supply port.



(1) Radiator pressure cap

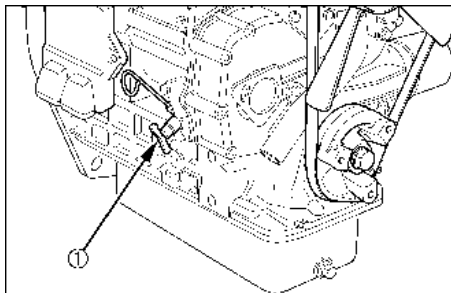
- If the radiator is provided with a recovery tank, check the coolant level of the recovery tank. When it is between the "FULL" and "LOW" marks, the coolant will last for one day's work.



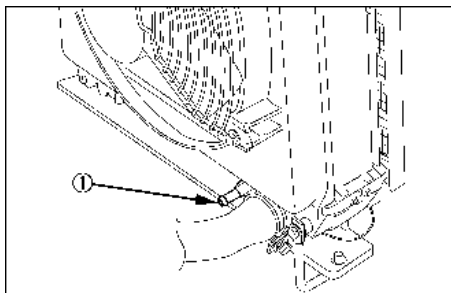
1ABACAAAP017A

- (1) Recovery tank                      (A) "FULL"  
 (B) "LOW"

- When the coolant level drops due to evaporation, add water only up to the full level.
- Check to see that two drain cocks; one is at the crankcase side and the other is at the lower part of the radiator as figures below.



1BGAAACAP039C



1BGVWVACAP011A

- (1) Coolant drain cock

**IMPORTANT :**

- If the radiator cap has to be removed, follow the caution and securely retighten the cap.
- If coolant should be leak, consult your local KUBOTA dealer.
- Make sure that muddy or sea water does not enter the radiator.
- Use clean, fresh water and 50% anti-freeze to fill the recovery tank.
- Do not refill recovery tank with coolant over the "FULL" level mark.
- Be sure to close the radiator cap securely. If the cap is loose or improperly closed, coolant may leak out and decrease quickly.

**Changing coolant**

- To drain coolant, always open both drain cocks and simultaneously open the radiator cap as well. With the radiator cap kept closed, a complete drain of water is impossible.
- Remove the overflow pipe of the radiator pressure cap to drain the recovery tank.
- Prescribed coolant volume (U.S.gallons)

Quantity	3.5 L (0.92 U.S.gals.)
----------	------------------------

**NOTE :**

- Coolant quantities shown are for standard radiators.
- An improperly tightened radiator cap or a gap between the cap and the seat quickens loss of coolant.
  - Coolant (Radiator cleaner and anti-freeze)

Season	Coolant
All seasons	Pure water and anti-freeze (See "Anti-freeze" in "RADIATOR" section.)

**Remedies for quick decrease of coolant**

- Check any dust and dirt between the radiator fins and tube. If any, remove them from the fins and the tube.
- Check the tightness of the fan belt. If loose, tighten it securely.
- Check the internal blockage in the radiator hose. If scale forms in the hose, clean with the scale inhibitor or its equivalent.

## ■ Checking radiator hoses and clamp bands



### WARNING

To avoid personal injury or death:

- Be sure to check radiator hoses and clamp bands periodically. If radiator hose is damaged or coolant leaks, overheats or severe burns could occur.

Check to see if radiator hoses are properly fixed every 200 hours of operation or 6 months, whichever comes first.

1. If hose clamps are loose or water leaks, tighten hose clamp securely.
2. Replace hoses and tighten hose clamps securely, if radiator hoses are swollen, hardened or cracked.

Replace hoses and hose clamps every 2 years or earlier, if checked and found that hoses are swollen, hardened or cracked.

## ■ Precaution at overheating

The event that the coolant temperature is nearly or more than the boiling point is called "OVERHEATING".

While running, make the following checks to see that all parts are working correctly. If anything is unusual, inspect it, referring to the relevant description in "MAINTENANCE" and "PERIODIC SERVICE" section.

### ◆ Coolant

If the coolant temperature warning lamp lights up or if steam or coolant does not stop squirting from the radiator overflow pipe, turn off the load and **keep the engine idling (COOLING-DOWN) for at least 5 minutes** to let it cool down gradually. Then stop the engine and take the following inspection and servicing.

1. Check to see if the coolant runs short or if there is any coolant leak;
2. Check to see if there is any obstacle around the cooling air inlet or outlet;
3. Check to see if there is any dirt or dust between radiator fins and tube;
4. Check to see if the fan belt is too loose; and
5. Check to see if radiator water pipe is clogged.

## ■ Cleaning radiator core (outside)

If dust is between the fin and tube, wash it away with running water.

### IMPORTANT:

- Do not clean radiator with firm tools such as spatulas or screwdrivers. They may damage specified fin or tube. It can cause coolant leaks or decrease cooling performance.

## ■ Anti-freeze



### WARNING

To avoid personal injury or death:

- When using anti-freeze, put on some protection such as rubber gloves. (Anti-freeze is poisonous.)
- If it is swallowed, seek immediate medical help. Do NOT make a person throw up unless told to do so by poison control or a health care professional. Use standard first aid and CPR for signs of shock or cardiac arrest. Call your local Poison Control Center or your local emergency number for further assistance.
- When anti-freeze comes in contact with the skin or clothing, wash it off immediately.
- Do not mix different types of anti-freeze. The mixture can produce chemical reaction causing harmful substances.
- Anti-freeze is extremely flammable and explosive under certain conditions. Keep fire and children away from anti-freeze.
- When draining fluids from the engine, place some container underneath the engine body.
- Do not pour waste onto the grounds, down a drain, or into any water source.
- Also, observe the relevant environmental protection regulations when disposing of anti-freeze.

Always use a 50/50 mix of long-life coolant and clean soft water in KUBOTA engines.

Contact KUBOTA concerning coolant for extreme conditions.

1. Long-life coolant (hereafter LLC) comes in several types. Use ethylene glycol (EG) type for this engine.
2. Before employing LLC-mixed cooling water, flush the radiator with fresh water. Repeat this procedure 2 or 3 times to clean up the radiator and engine block from inside.
3. Mixing the LLC  
Premix 50% LLC with 50% clean soft water. When mixing, stir it up well, and then fill into the radiator.

- The procedure for the mixing of water and anti-freeze differs according to the make of the anti-freeze. Refer to SAE J1034 standard, more specifically also to SAE J814c.

Vol % Anti-freeze	Freezing Point		Boiling Point *	
	°C	°F	°C	°F
50	-37	-34	108	226

\*At 1.013 x 10<sup>5</sup>Pa (760 mmHg) pressure (atmospheric). A higher boiling point is obtained by using a radiator pressure cap which permits the development of pressure within the cooling system.

- Adding the LLC
  - Add only water if the coolant level reduces in the cooling system by evaporation.
  - If there is a coolant leak, add the LLC of the same manufacturer and type in the same coolant percentage.

\*Never add any long-life coolant of different manufacturer. (Different brands may have different additive components, and the engine may fail to perform as specified.)
- When the LLC is mixed, do not employ any radiator cleaning agent. The LLC contains anti-corrosive agent. If mixed with the cleaning agent, sludge may build up, adversely affecting the engine parts.
- Kubota's genuine long-life coolant has a service life of 1 year. Be sure to change the coolant every year.

**NOTE :**

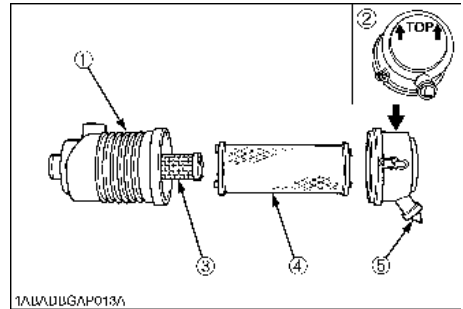
- The above data represents industry standards that necessitate minimum glycol content in the concentrated anti-freeze.

**AIR CLEANER**

Since the air cleaner employed on this engine is a dry type, never apply oil to it.

- Open the evacuator valve once a week under ordinary conditions - or daily when used in a dusty place. This will get rid of large particles of dust and dirt.
- Wipe the inside air cleaner clean with cloth if it is dirty or wet.
- Avoid touching the element except when cleaning.
- When dry dust adheres to the element, blow compressed air from the inside turning the element. Pressure of compressed air must be under 205 kPa (2.1 kgf/cm<sup>2</sup>, 30 psi).
- Replace the primary element every year or every 6 cleanings.
 

If the primary element is stained heavily, replace it soon. At this time, replace the secondary element too.
- The secondary element should be removed only if it is to be replaced.
- To protect the engine, do not remove the secondary element in servicing the primary element.



- Air cleaner body
- Cover
- Secondary element
- Primary element
- Evacuator valve

**IMPORTANT :**

- Make sure the hooking clip for cover for the element is tight enough. If it is loose, dust and dirt may be sucked in, wearing down the cylinder liner and piston ring earlier and thereby resulting in poor power output.
- Do not overservice the air cleaner element. Overservicing may cause dirt to enter the engine causing premature wear. Use the dust indicator as a guide on when to service.

**■ Cleaning primary air cleaner element**

- To clean the element, use clean dry compressed air on the inside of the element.
 

Air pressure at the nozzle must not exceed 205 kPa (2.1 kgf/cm<sup>2</sup>, 30psi).  
Maintain reasonable distance between the nozzle and the filter.

### ■ Evacuator valve

Open the evacuator valve once a week under ordinary conditions - or daily when used in a dusty place - to get rid of large particles of dust and dirt.

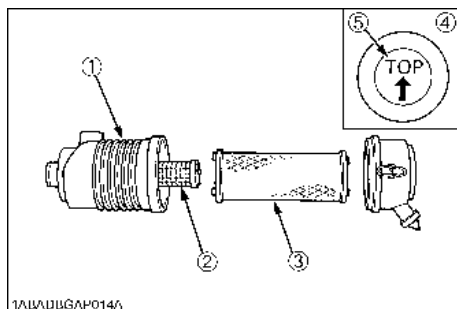
### ■ For the air cleaner with a dust cup (optional)

Remove and clean out the dust cup before it becomes half full with dust; usually once a week, or even every day if the working surroundings are dusty.

Install the air cleaner dust cup with "TOP" indicated on the rear of the cup in the up position. (However, it may be installed in either direction when the cover is placed at the lower part.)

#### IMPORTANT :

- If the dust cup is mounted incorrectly, dust or dirt does not collect in the cup, and direct attachments of the dust to the element will cause its lifetime to shorten to a great extent.

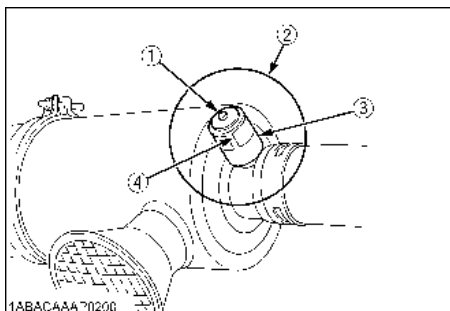


- (1) Air cleaner body
- (2) Secondary element
- (3) Primary element
- (4) Dust cup
- (5) "TOP" mark

### ■ Dust indicator (optional)

If the red signal on the dust indicator attached to the air cleaner is visible, the air cleaner has reached the service level.

Clean the element immediately, and reset the signal with the "RESET" button.



- (1) "RESET" button
- (2) Dust indicator
- (3) Service level
- (4) Signal

## FUEL SYSTEM AND DIAGRAMS

### ■ Gaseous fuel system

Never use LPG fuel on the WG972-G, N engine. Otherwise severe damage will occur.

Never use CNG fuel on the WG972-G, L, GL engine. Otherwise severe damage will occur.

- All fuel connections added to this engine must be installed by qualified personnel and utilizing recognized procedures and standards.
- Do not let any dirt and sealant material enter the inside of fuel line, or engine performance may deteriorate.
- These non-KUBOTA installed parts, such as hoses, fittings, piping and shut off solenoid valve should be approved for LPG or CNG use and conform to UL, CSA, NFPA,MSHA and all other applicable standards.
- Lock off valve and pressure sensor should be installed between the CNG tank and high pressure regulator.

### ■ Tightening torques and leak check for gas regulator with vaporizer

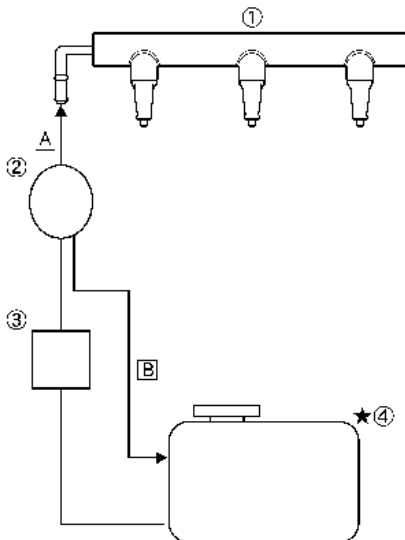
Each fitting must be sealed with approved joint sealant compound, and be tightened to the specified torque using a wrench and leak check must be performed as shown in the below table.

FITTING	Q'TY	SIZE	Tightening torque			Leak check pressure		
			N-m	kgf-m	ft-lbs	kPa	kgf-cm <sup>2</sup>	psi
Gas OUT (VAPOR)	1	5/8" Hose Fitting	---	---	---	1	0.01	0.145
Gas IN (LIQUID)*	1	1/4 NPT	19.6 to 39.2	2.0 to 4.0	14.5 to 28.9	2170	22.1	315
WATER IN / OUT	2	3/8" Hose Fitting	---	---	---	150	1.5	21.8

\*NOT KUBOTA supplied

### ■ Fuel system diagrams

#### ◆ Gasoline [WG972-G / WG972-GL]



- (1) Fuel rail
- (2) Fuel pump assy
- (3) Fuel filter
- ★ (4) Gasoline tank

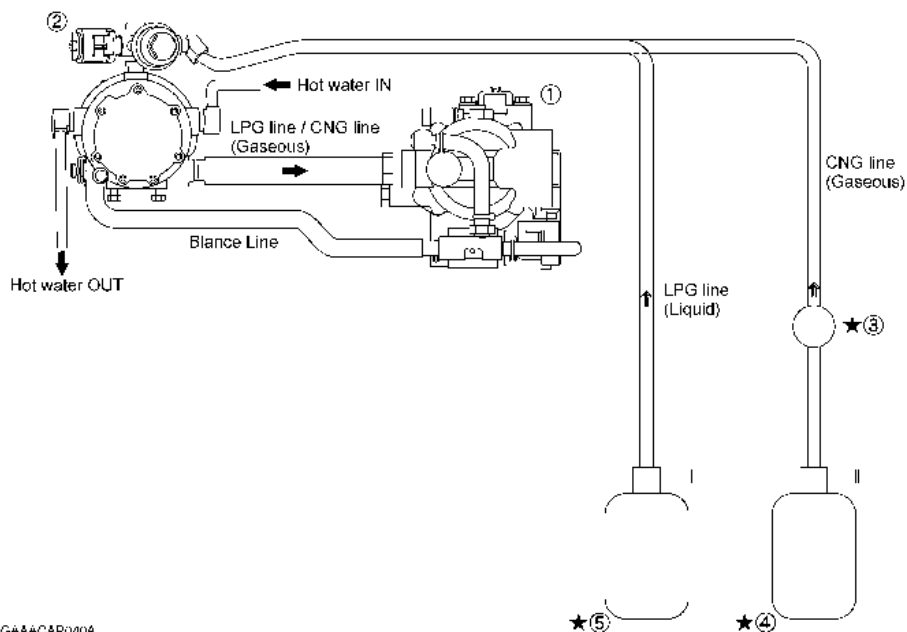
**NOTE :**

- The ★-marked component parts are Not Provided by KUBOTA.

- (A) Gasoline line
- (B) Bleed / Return circuit (If necessary)



## ◆ Gaseous fuel [WG972-GL / WG972-L / WG972-N]



1RGAAACAP040A

- (1) Gas mixer
- (2) Gas regulator with vaporizer (with lock off valve)
- ★ (3) High pressure regulator
- ★ (4) CNG tank (with manual valve)
- ★ (5) LPG tank (with manual valve)

**NOTE :**

- The ★-marked component parts are Not Provided by KUBOTA.
- Recommend:  
Install the lock off valve before the high pressure regulator and install the pressure sensor of CNG tank.
- The related parts and the method of installation should be approved for LPG or CNG use and conform to local regulations and all other standards.

## ELECTRIC WIRING



### WARNING

To avoid personal injury or death:

- ◆ Shorting of electric cable or wiring may cause a fire.
  - Check to see if electric cables and wiring are swollen, hardened or cracked.
  - Keep dust and water away from all power connections.
- Loose wiring terminal parts, make bad connections. Be sure to repair them before starting the engine.

Damaged wiring reduces the capacity of electrical parts. Change or repair damaged wiring immediately.

## FAN BELT

### ■ Adjusting fan belt tension



### WARNING

To avoid personal injury or death:

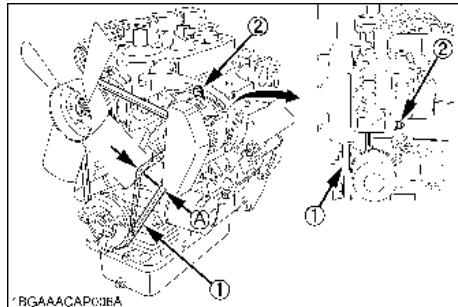
- Be sure to stop the engine and remove the key before checking the belt tension.
- Be sure to reinstall the detached safety shield after maintenance or checking.

Proper fan belt tension	A deflection of between 7 to 9 mm (0.28 to 0.35 in.) when the belt is pressed in the middle of the span.
-------------------------	----------------------------------------------------------------------------------------------------------

1. Stop the engine and remove the key.
2. Apply moderate thumb pressure to belt between the pulleys.
3. If tension is incorrect, loosen the alternator mounting bolts and, using a lever placed between the alternator and the engine block, pull the alternator out until the deflection of the belt falls within acceptable limits.
4. Replace fan belt if it is damaged.

### IMPORTANT :

- If belt is loosen or damaged and the fan is damaged, it could result in overheats or insufficient charging. Correct or replace belt.



- (1) Fan belt  
 (2) Bolt and nut  
 (A) 7 to 9 mm (0.28 to 0.35 in.)  
 (under load of 10 kgf (22.1 lbs))

# CARRIAGE AND STORAGE

## CARRIAGE



### WARNING

To avoid personal injury or death:

- Fix the engine securely not to fall during operation.
- Do not stand near or under the engine while carrying it.
- The engine is heavy. In handling it, be very alert not to get your hands and body caught in.

1. Use carrier such as a crane when moving the engine to avoid bodily injury. Support the engine securely to avoid injury or damage.
2. When lifting the engine, put the hook securely to metal fittings attached to the engine. Use strong hook and fittings enough to hang the engine.

## STORAGE



### WARNING

To avoid personal injury or death:

- Do not clean the machine with engine running.
- To avoid the danger of exhaust fume poisoning, do not operate the engine in a closed building without proper ventilation.
- When storing the engine just after running, let the engine cool off.

Before storing the engine for more than a few months, remove any dirt on the machine, and:

1. Drain the coolant in the radiator. Open the cock at the bottom of the radiator, and remove the pressure cap to drain water completely. Leave the cock open. Hang a note written "No water" on the pressure cap. Since water may freeze when the temperature drops below 0°C (32°F), it is very important that no water is left in the machine.

### NOTE :

- When using anti-freeze, it is not necessary to take step (1) above.
2. Remove dirty engine oil, fill with new oil and run the engine for about 5 minutes to let the oil penetrate to all the parts.
  3. Check all the bolts and nuts, and tighten if necessary.
  4. Remove the battery from the engine, adjust the electrolyte level, and recharge it. Store the battery in a dry and dark place.
  5. When the engine is not used for a long period of time, run it for about 5 minutes under no load every 2 to 3 months to keep it free from rust. If the engine is stored without any running, moisture in the air may condense into dew over the sliding parts of the engine, resulting in rust there.
  6. If you forget to run the engine for longer than 5 to 6 months, apply enough engine oil to the valve guide and valve stem seal and make sure the valve works smoothly before starting the engine.
  7. Store the engine in a flat place and remove the key from engine.
  8. Do not store the engine in a place where has flammable materials such as dry grass or straw.
  9. When covering the engine for storage, let engine and muffler cool off completely.
  10. Operate the engine after checking and repairing damaged wirings or pipes, and clearing flammable materials carried by mouse.

# TROUBLESHOOTING

The engine malfunctions can result from a large number of causes. The following describes symptoms that are encountered relatively more often than others, their major causes and remedies.

## ■ When it is difficult to start the engine

Cause	Countermeasures
Fuel doesn't flow.	* Check the fuel tank, fuel filter, fuel hoses and fuel pump. * As fuel will be filtered by the filter, if there should be water or other foreign matters on the filter, clean the filter.
Valve clearance is not as specified.	* Adjust valve clearance when the engine is cold.
Engine oil becomes thick in cold weather and engine cranks slow.	* Change grade of oil according to the weather (temperature).
Low compression	* Bad valve or excessive wear of rings, pistons and liners cause insufficient compression. Replace with new parts.
Battery is discharged and the engine will not crank.	* Charge battery. * In winter, always remove battery from machine, charge fully and keep indoors. Install in machine at time of use.
Clogged air cleaner	* Clean or replace.
Spark plug electrodes are wet with gasoline	* Dry electrode and restart.
Defective starter	* Repair or replace.
Defective main switch	* Repair or replace.
Defective vaporizer	* Repair or replace. Do not take the regulator body apart.
Defective lock off valve	* Repair or replace.
Disconnection	* Check the wire harness.

## ■ When output is insufficient

Cause	Countermeasures
Compression is insufficient.	* Bad valve or excessive wear of rings, pistons and liners cause insufficient compression. Replace with new parts.
Fuel is insufficient.	* Check fuel system.
Overheating of moving parts	* Check lubricating oil system. * Check to see if lubricating oil filter is working properly. * Filter element deposited with impurities would cause poor lubrication. Change element. * Check to see if the clearance of bearing is within factory specs.
Valve clearance is not as specified.	* Adjust valve clearance when the engine is cold.
Air cleaner is dirty.	* Clean or replace.
Defective spark plug	* Clean or replace.
Defective ignition coil	* Replace.
Disconnection	* Check the wire harness.

### ■ When engine speed is insufficient

Cause	Countermeasures
Improper or defective spark plug	* Clean or replace.
Defective ignition coil	* Replace.
Defective throttle body	* Replace.
Breather tube has separated.	* Attach correctly.
Improper input signal to ECU	* Check the wire harness.
Disconnection	* Check the wire harness.

### ■ When engine suddenly stops

Cause	Countermeasures
Lack of fuel	* Check the fuel tank and refill the fuel, if necessary. * Also check the fuel system for air or leaks.
Moving parts are overheated due to shortage of lubrication oil or improper lubrication.	* Check amount of engine oil with oil level gauge. * Check lubricating oil system. * Replace oil filter cartridge.
Clogged air cleaner	* Clean or replace.
Disconnection	* Check the wire harness.

### ■ When excessive black exhaust gas is observed

Cause	Countermeasures
Fuel system is bad.	* Check the fuel system.
Fuel is extremely poor quality.	* Replace fuel.

### ■ When blue exhaust gas is observed

Cause	Countermeasures
Excessive engine oil	* Reduce to specified level.
Piston ring and liner worn or stuck	* Replace.
Defective valve stem seal	* Replace.

### ■ When lubricant oil consumption is excessive

Cause	Countermeasures
Oil leaking from oil seal, gasket, etc.	* Replace.
Defective valve stem seal	* Replace.
Piston ring and liner worn or stuck	* Replace.

### ■ When engine overheats

Cause	Countermeasures
Engine oil insufficient	* Check oil level. Replenish oil as required.
Fan belt broken or elongated	* Change belt or adjust belt tension.
Coolant insufficient	* Replenish coolant.
Excessive concentration of antifreeze	* Add water only or change to coolant with the specified mixing ratio.
Radiator net or radiator fin clogged with dust	* Clean net or fin carefully.
Inside of radiator or coolant flow route corroded	* Clean or replace radiator and parts.
Defective fan or radiator or radiator cap	* Replace defective parts.
Defective thermostat	* Check thermostat and replace if necessary.
Defective temperature sensor	* Check temperature with thermometer and replace if necessary.
Overload running	* Reduce load.
Head gasket defective or water leakage	* Replace parts.

#### NOTE :

- If the cause of trouble can not be found, consult your KUBOTA dealer.
- If MIL (Malfunction Indicator Light) lights up, consult your KUBOTA dealer.

# SPECIFICATIONS

Model		WG972-G-E4		WG972-GL-E4	
		Gasoline		Gasoline	LPG
Type		Vertical, Water-cooled 4 cycle			
No. of cylinders - bore x stroke		mm (in.) 3- $\phi$ 74.5 x 73.6 (2.93 x 2.90)			
Total displacement		L (cu.in.) 0.962 (58.68)			
Brake horse power	SAE Gross intermittent	kW(HP) / min <sup>-1</sup> (rpm)	24.2 (32.5) / 3600	23.2 (31.1) / 3600	22.0 (29.5) / 3600
	SAE net intermittent	kW(HP) / min <sup>-1</sup> (rpm)	23.1 (31.0) / 3600	22.0 (29.5) / 3600	20.3 (27.2) / 3600
	SAE net continuous	kW(HP) / min <sup>-1</sup> (rpm)	18.7 (25.0) / 3600	17.6 (23.6) / 3600	16.3 (21.9) / 3600
Max. torque	SAE Gross intermittent	N-m (kgf-m) / min <sup>-1</sup> (rpm)	68.6 (7.0) / 2400	66.6 (6.8) / 2400	66.2 (6.8) / 1800
Governor type		Electronic Governor			
Ignition system		Full transistor battery ignition type			
Fuel used		Unleaded gasoline		Commercial LPG*1	
Lubricating oil capacity		L (US gals.) 3.4 (0.90)			
Starter		12 V x 1.0 kW			
Total dimensions (L x W x H)		mm (in.)	453 (17.8) x 393 (15.4) x 503 (19.8)	516 (20.3) x 393 (15.4) x 503 (19.8)	
Weight (Dry)		kg (lbs)	74 (163.1)	77.7 (171.3)	
<b>Common tune up specification</b>					
Minimum bare idling speed		min <sup>-1</sup> (rpm)	1000 $\pm$ 30		
Maximum bare speed		min <sup>-1</sup> (rpm)	3600 $\pm$ 30		
Ignition timing (no-load condition)		deg. BTDC / rpm	40° / 3600		21° / 3600
Spark plug type / Spark plug gap		mm (in.)	NGK BKR6E 0.7 to 0.8 (0.028 to 0.031)		
Intake / Exhaust valve clearance Check when engine is cold.		mm (in.)	0.165 $\pm$ 0.02 (0.0065 $\pm$ 0.00079)		
EU engine family name		JKBXS.9622KD	JKBXS.9622KH		
CO <sub>2</sub> Emission data Non-road steady-state test cycle		g/kWh	1023.8	1026.8	1018.2 (Fuel A*2) 980.0 (Fuel B*2)

**NOTE :**

- Specifications are subject to change without notice.
- This CO<sub>2</sub> measurement results from testing over a fixed test cycle under laboratory conditions a(n) (parent) engine representative of the engine type (engine family) and shall not imply or express any guarantee of the performance of a particular engine.

\*1 LPG regulator with vaporizer operates on a liquid withdrawal type system.

\*2 Defined in Annex IX to Delegated Regulation (EU) 2017/654.

Model		WG972-L-E4		WG972-N-E4	
		LPG		CNG	
Type		Vertical, Water-cooled 4 cycle			
No. of cylinders - bore x stroke		mm (in.) 3- $\phi$ 74.5 x 73.6 (2.93 x 2.90)			
Total displacement		L (cu-in.) 0.962 (58.68)			
Brake horse power	SAE Gross intermittent	kW(HP) / min <sup>-1</sup> (rpm)	22.0 (29.5) / 3600	20.4 (27.4) / 3600	
	SAE net intermittent	kW(HP) / min <sup>-1</sup> (rpm)	20.3 (27.2) / 3600	18.8 (25.2) / 3600	
	SAE net continuous	kW(HP) / min <sup>-1</sup> (rpm)	16.3 (21.9) / 3600	15.0 (20.1) / 3600	
Max. torque	SAE Gross intermittent	N-m (kgf-m) / min <sup>-1</sup> (rpm)	66.2 (6.8) / 1800	63.1 (6.4) / 2000	
Governor type		Electronic Governor			
Ignition system		Full transistor battery ignition type			
Fuel used		Commercial LPG*1		CNG	
Lubricating oil capacity		L (US gals.)	3.4 (0.90)		
Starter		12 V x 1.0 kW			
Total dimensions (L x W x H)		mm (in.)	516 (20.3) x 393 (15.4) x 503 (19.8)		
Weight (Dry)		kg (lbs)	77.4 (170.6)		
<b>Common tune up specification</b>					
Minimum bare idling speed		min <sup>-1</sup> (rpm)	1000 $\pm$ 30		
Maximum bare speed		min <sup>-1</sup> (rpm)	3600 $\pm$ 30		
Ignition timing		deg. BTDC / rpm	21° / 3600	28° / 3600	
Spark plug type / Spark plug gap		mm (in.)	NGK BKR6E 0.7 to 0.8 (0.028 to 0.031)		
Intake / Exhaust valve clearance Check when engine is cold.		mm (in.)	0.165 $\pm$ 0.02 (0.0065 $\pm$ 0.00079)		
EU engine family name			JKBXS.9622KH	JKBXS.9622KT	
CO <sub>2</sub> Emission data Non-road steady-state test cycle		g/kWh	1018.2 (Fuel A*2) 980.0 (Fuel B*2)	802.6 (G <sub>R</sub> *2) 650.5 (G <sub>25</sub> *2)	

**NOTE :**

- Specifications are subject to change without notice.
- This CO<sub>2</sub> measurement results from testing over a fixed test cycle under laboratory conditions a(n) (parent) engine representative of the engine type (engine family) and shall not imply or express any guarantee of the performance of a particular engine.

\*1 LPG regulator with vaporizer operates on a liquid withdrawal type system.

\*2 Defined in Annex IX to Delegated Regulation (EU) 2017/654.





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**NOTES:**

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