GE 275 VPSX
GE 275 VPMSX

0 2 0 9

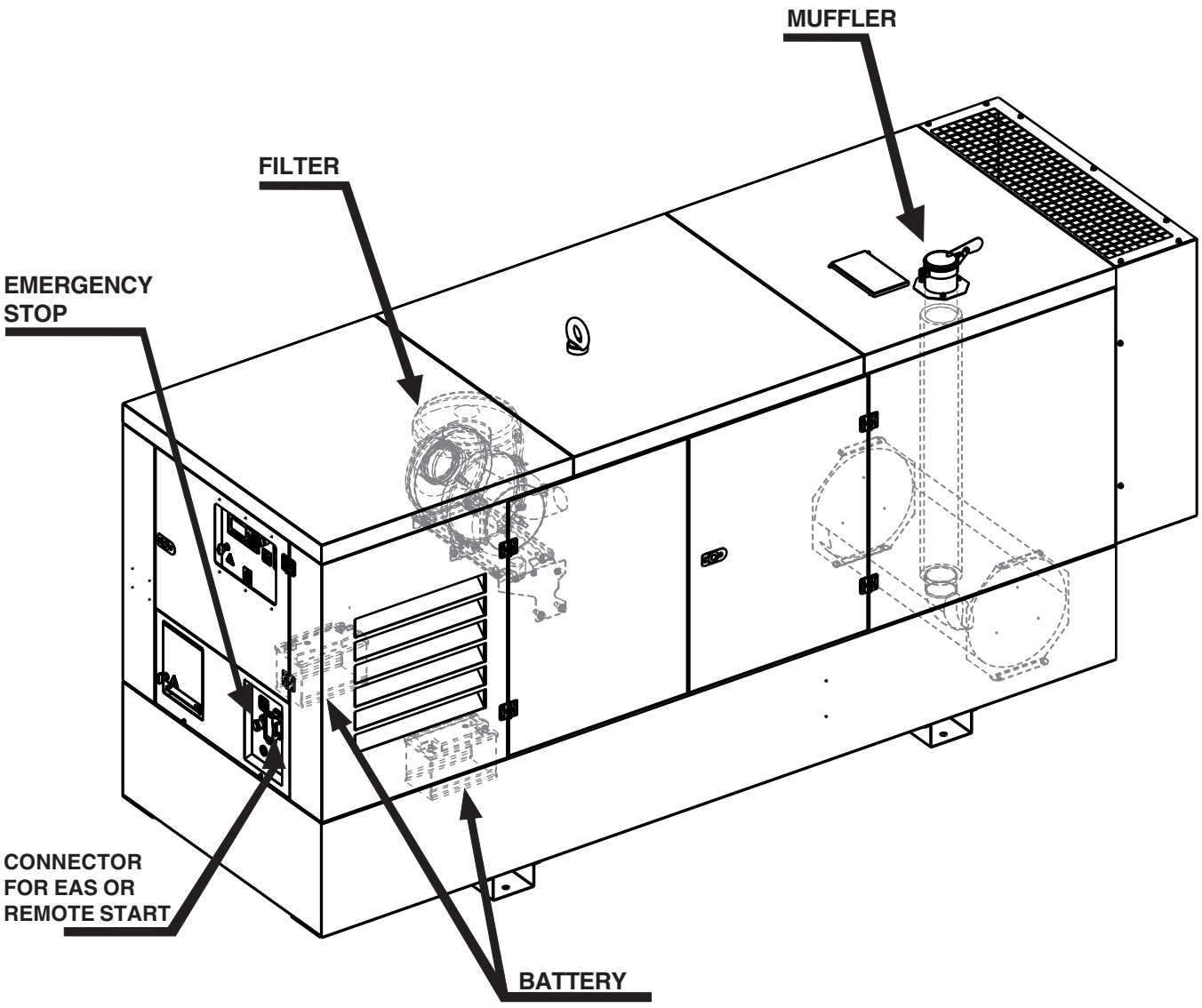
842779003 - GB

USE AND MAINTENANCE MANUAL
SPARE PARTS CATALOGS

25/05/07 84277M00
preparato da UPT
approvato da DITE

Main Characteristics of GE 85:

- Three-phase electric power (max) 220 kW / 400 V / 50 Hz.
- Diesel engine VOLVO PENTA/TAD734GE
- Synchronous alternator
- Tank of 250l with autonomy of 6.5h
- Dimensions / weight, 4000x1300x1950, 3050 Kg (GE 275 VPSX) - 3040 Kg (GE 275 VPMSX)
- Noise level at 7m 72 dB(A)
- Prepared for automatic start unit.
- Prepared for remote start/stop.



The unit is composed by : a base, a tank, an engine/alternator unit fixed on the base by 4 elastic dampers, a roll-bar, with hook for an easy and sure lifting, a base complete with doors for a quick access to the engine, to the air filter and to the battery. The set is also equipped with a electrical board where there are mounted protections and measuring instruments, which are protected by a same sized cover.

IQNet
THE INTERNATIONAL CERTIFICATION NETWORK

CERTIFICATE

IQNet and its partner
CISQ/ICIM
hereby certify that the organization

BCS S.p.A.

Head Office and Operative Unit: Viale Mazzini, 161 - I-20081 Abbiategrasso (MI)
Operative Units: Via Valbrina, 17/19 - I-42045 Luzzara (RE)
Viale Europa, 59 - I-20090 Cusago (MI)

for the following field of activities

Design, production and servicing of tractors, agricultural and green maintenance machines, engine driven welders and generating sets.

has implemented and maintains a

Quality Management System

which fulfills the requirements of the following standard

ISO 9001:2000

Issued on: **2009-03-06**
Validity date: **2012-03-05**
Registration Number: IT-3722

IQNet — CISQ

René Wasmer
President of IQNET

Gianrenzo Prati
President of CISQ

IQNet partners*:
AENOR *Spain* AFAQ AFNOR *France* AIB-Vincotte International *Belgium* ANCE *Mexico* APCER *Portugal* CISQ *Italy* CQC *China* CQM *China* CQS *Czech Republic* Cro Cert *Croatia* DQS *Germany* DS *Denmark* ELOT *Greece* FCAV *Brazil* FONDONORMA *Venezuela* HKQAA *Hong Kong China* ICONTEC *Colombia* IMNC *Mexico* Inspecta Certification *Finland* IRAM *Argentina* JQA *Japan* KFQ *Korea* MSZT *Hungary* Nemko AS *Norway* NSAI *Ireland* PCBC *Poland* QMI *Canada* Quality Austria *Austria* RR *Russia* SAI Global *Australia* SII *Israel* SIQ *Slovenia* SIRIM QAS International *Malaysia* SQS *Switzerland* SRAC *Romania* TEST St Petersburg *Russia* *YUQS Serbia*
IQNet is represented in the USA by: AFAQ AFNOR, AIB-Vincotte International, CISQ, DQS, NSAI Inc., QMI and SAI Global
*The list of IQNet partners is valid at the time of issue of this certificate. Updated information is available under www.iqnet-certification.com

CISQ is a member of IQNet

ICIM
www.icim.it

CERTIFICATO n. 0192/5
CERTIFICATE No.

SI CERTIFICA CHE IL SISTEMA DI GESTIONE PER LA QUALITA' DI
WE HEREBY CERTIFY THAT THE QUALITY MANAGEMENT SYSTEM OPERATED BY

BCS S.p.A.

UNITA' OPERATIVE
OPERATIVE UNITS

Sede e Unità Operativa: Viale Mazzini, 161 - 20081 Abbiategrasso (MI)
Unità Operative: Via Valbrina, 17/19 - 42045 Luzzara (RE)
Viale Europa, 59 - 20090 Cusago (MI)
Italia

E' CONFORME ALLA NORMA
IS IN COMPLIANCE WITH THE STANDARD

UNI EN ISO 9001:2000

PER LE SEGUENTI ATTIVITA'
FOR THE FOLLOWING ACTIVITIES

EA: 18

Progettazione, produzione ed assistenza di trattori, macchine per agricoltura e manutenzione del verde, motosaldatrici e gruppi elettrogeni.

Design, production and servicing of tractors, agricultural and green maintenance machines, engine driven welders and generating sets.

Riferirsi al Manuale della Qualità per l'applicabilità dei requisiti della Norma ISO 9001:2000.
Refer to Quality Manual for details of application to ISO 9001:2000 requirements.

Il presente certificato è soggetto al rispetto del regolamento per la certificazione dei sistemi di gestione per la qualità delle aziende.
The use and the validity of this certificate shall satisfy the requirements of the rules for the certification of company quality management systems.

Data emissione *First issue*	Emissione corrente *Current issue*	Data di scadenza *Expiring date*
30/05/1994	06/03/2009	05/03/2012

ICIM S.p.A. – PIAZZA A. DIAZ, 2 - 20123 MILANO

SINCERT

CISQ is the Italian Federation of management system Certification Bodies

FEDERAZIONE CISQ

UNI EN ISO 9001 : 2000

ISO 9001:2000 - Cert. 0192

MOSA has certified its quality system according to UNI EN ISO 9001:2000 to ensure a constant, high quality of its products. This certification covers the design, production and servicing of engine driven welders and generating sets.

The certifying institute, ICIM, which is a member of the International Certification Network IQNet, awarded the official approval to MOSA after an examination of its operations at the head office and plant in Cusago (MI), Italy.

This certification is not a point of arrival but a pledge on the part of the entire company to maintain a level of quality of both its products and services which will continue to satisfy the needs of its clients, as well as to improve the transparency and the communications regarding all the company's actives in accordance with the official procedures and in harmony with the MOSA Manual of Quality.

The advantages for MOSA clients are:

- Constant quality of products and services at the high level which the client expects;
- Continuous efforts to improve the products and their performance at competitive conditions;
- Competent support in the solution of problems;
- Information and training in the correct application and use of the products to assure the security of the operator and protect the environment;
- Regular inspections by ICIM to confirm that the requirements of the company's quality system and ISO 9001 are being respected.

All these advantages are guaranteed by the CERTIFICATE OF QUALITY SYSTEM No.0192 issued by ICIM S.p.A. - Milano (Italy) - www.icim.it

25/05/07 84277-GB

⚠ ATTENTION

This use and maintenance manual is an important part of the machines in question.
The assistance and maintenance personel must keep said manual at disposal, as well as that for the engine and alternator (if the machine is synchronous) and all other documentation about the machine.

We advise you to pay attention to the pages concerning the security (see page M1.1).

MOSA

INFORMATION

Dear Customer,
We wish to thank you for having bought from MOSA a high quality set.

Our sections for Technical Service and Spare Parts will work at best to help you if it were necessary.

To this purpose we advise you, for all control and overhaul operations, to turn to the nearest authorized Service Centre, where you will obtain a prompt and specialized intervention.

☞ In case you do not profit on these Services and some parts are replaced, please ask and be sure that are used exclusively original MOSA parts; this to guarantee that the performances and the initial safety prescribed by the norms in force are re-established.

☞ *The use of **non original spare parts will cancel immediately** any guarantee and Technical Service obligation from MOSA.*

NOTES ABOUT THE MANUAL

Before actioning the machine please read this manual attentively. Follow the instructions contained in it, in this way you will avoid inconveniences due to negligence, mistakes or incorrect maintenance. The manual is for qualified personnel, who knows the rules: about safety and health, installation and use of sets movable as well as fixed.

You must remember that, in case you have difficulties for use or installation or others, our Technical Service is always at your disposal for explanations or interventions.

The manual for Use Maintenance and Spare Parts is an integrant part of the product. It must be kept with care during all the life of the product.
In case the machine and/or the set should be yielded to another user, this manual must also given to him.
Do not damage it, do not take parts away, do not tear pages and keep it in places protected from dampness and heat.

You must take into account that some figures contained in it want only to identify the described parts and therefore might not correspond to the machine in your possession.

INFORMATION OF GENERAL TYPE

In the envelope given together with the machine and/or set you will find: the manual for Use Maintenance and Spare Parts, the manual for use of the engine and the tools (if included in the equipment), the guarantee (in the countries where it is prescribed by law).

Our products have been designed for the use of generation for welding, electric and hydraulic system; ANY OTHER DIFFERENT USE NOT INCLUDED IN THE ONE INDICATED, relieves MOSA from the risks which could happen or, anyway, from that which was agreed when selling the machine; MOSA excludes any responsibility for damages to the machine, to the things or to persons in this case.

Our products are made in conformity with the safety norms in force, for which it is advisable to use all these devices or information so that the use does not bring damage to persons or things.

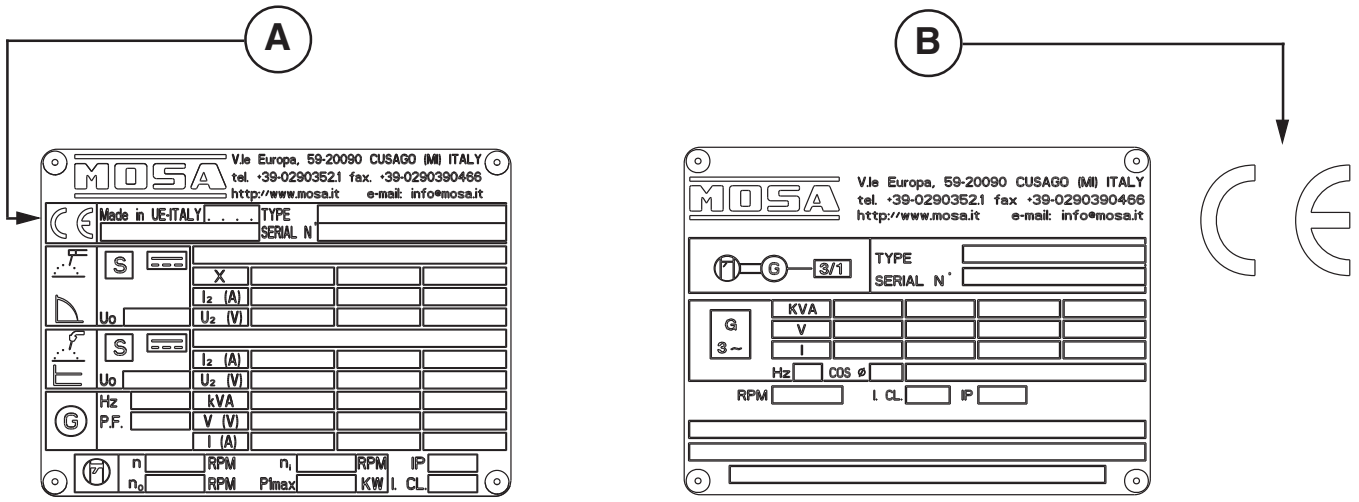
While working it is advisable to keep to the personal safety norms in force in the countries to which the product is destined (clothing, work tools, etc.).

Do not modify for any motive parts of the machine (fastenings, holes, electric or mechanical devices, others..) if not duly authorized in writing by MOSA: the responsibility coming from any potential intervention will fall on the executioner as in fact he becomes maker of the machine.

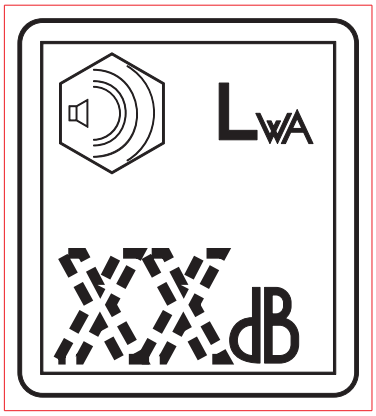
☞ ***Notice:** this manual does not engage MOSA, who keeps the faculty, apart the essential characteristics of the model here described and illustrated, to bring betterments and modifications to parts and accessories, without putting this manual uptodate immediately.*

Any of our product is labelled with CE marking attesting its conformity to appliable directives and also the fulfillment of safety requirements of the product itself; the list of these directives is part of the declaration of conformity included in any machine standard equipment.
Here below the adopted symbol:

CE marking is clearly readable and unerasable and it can be either part of the data-plate (A) or placed as a sticker near the data-plate (B)



Furthermore, on each model it is shown the noise level value; the symbol used is the following:



The indication is shown in a clear, readable and indeleble way on a sticker.

The generating set GE 275 is a unit which transforms the mechanical energy, generated by endothermic engine, into electric energy, through an alternator.
Is meant for industrial and professional use, powered by an endothermic engine; it is composed of various main parts such as: engine, alternator, electric and electronic controls, the fairing or a protective structure.
The assembling is made on a steel structure, on which are provided elastic support which must damp the vibrations and also eliminate sounds which would produce noise.

Technical data	GE 275 VPSX	GE 275 VPMSX
GENERATOR		
Power (*stand by)	275 kVA / 400 V / 397 A	
Power (**P.R.P.)	250 kVA / 400 V / 361 A	
Active power (*stand by)	220 kW / 400 V / 318 A	
Active power (**P.R.P.)	220 kW / 400 V / 289 A	
Frequency	50 Hz	
Cos φ	0.8	
ALTERNATOR	Self-excited, self-regulated with AVR	
type	three-phase, synchronous	
Insulation class	H	
ENGINE		
Make / Model	VOLVO PENTA / TAD734GE	
Type / Cooling system	Diesel Turbo-common rail / Liquid	
Cylinders / Displacement	6 on line / 7150 cm^3	
Power (*stand by)	241 kW (327 CV)	
Power (**P.R.P.)	216 kW (293 CV)	
Speed	1500 rpm	
Fuel consumption	204 g/kWh	
Cooling system capacity	32 l	
Engine oil capacity	24 l	
Starter	Electric	
GENERAL SPECIFICATIONS		
Battery	24V (2x12V - 100Ah)	
Tank capacity	250 l	
Running time (75%)	6.5 h	
Protection	IP 44	
Dimensions / max. on base Lxwxh (mm) *	4000x1300x1950	
Weight on base	3050 Kg	3040 Kg
Measured acoustic power	97 LWA (72 db(A) - 7 m)	97 LWA (72 db(A) - 7 m)
Garanteed acoustic power	97 LWA (72 db(A) - 7 m)	97 LWA (72 db(A) - 7 m)

* Dimensions and weight are inclusive of all parts

OUTPUT

Declared power according to ISO 8528-1 (temperature 25°C, 30% relative humidity, altitude 100 m above sea level).
(*Stand-by) = maximum available power for use at variable loads for a yearly number of hours limited at 500 h. No overload is admitted.
(**Prime power P.R.P.) = maximum available power for use at variable loads for a yearly illimited number of hours. The average power to be taken during a period of 24 h must not be over 80% of the P.R.P.
It's admitted overload of 10% each hour every 12 h.
In an **approximative** way one reduces: of 1% every 100 m altitude and of 2.5% for every 5°C above 25°C.

ACOUSTIC POWER LEVEL

ATTENTION: The concrete risk due to the machine depends on the conditions in which it is used. Therefore, it is up to the end-user and under his direct responsibility to make a correct evaluation of the same risk and to adopt specific precautions (for instance, adopting a I.P.D. -Individual Protection Device)
Acoustic Noise Level (LWA) - Measure Unit dB(A): it stands for acoustic noise released in a certain delay of time. This is not submitted to the distance of measurement.
Acoustic Pressure (Lp) - Measure Unit dB(A): it measures the pressure originated by sound waves emission. Its value changes in proportion to the distance of measurement.
The here below table shows examples of acoustic pressure (Lp) at different distances from a machine with Acoustic Noise Level (**LWA**) of 95 dB(A)

Lp a 1 meter = 95 dB(A) - 8 dB(A) = 87 dB(A)
Lp a 4 meters = 95 dB(A) - 20 dB(A) = 75 dB(A)
Lp a 7 meters = 95 dB(A) - 25 dB(A) = 70 dB(A)
Lp a 10 meters = 95 dB(A) - 28 dB(A) = 67 dB(A)

PLEASE NOTE: the symbol LWA 2000/14/CE when with acoustic noise values, indicates that the device respects noise emission limits according to 2000/14/CE directive.

SYMBOLS IN THIS MANUAL

- The symbols used in this manual are designed to call your attention to important aspects of the operation of the machine as well as potential hazards and dangers for persons and things.

IMPORTANT ADVICE

- Advice to the User about the safety:

☞ N.B.: The information contained in the manual can be changed without notice.
Potential damages caused in relation to the use of these instructions will not be considered because these are only indicative.
Remember that the non observance of the indications reported by us might cause damage to persons or things.
It is understood, that local dispositions and/or laws must be respected.

WARNING

Situations of danger - no harm to persons or things

Do not use without protective devices provided
Removing or disabling protective devices on the machine is prohibited.

Do not use the machine if it is not in good technical condition
The machine must be in good working order before being used. Defects, especially those which regard the safety of the machine, must be repaired before using the machine.

SAFETY PRECAUTIONS

DANGEROUS

This heading warns of an immediate danger for persons as well for things. Not following the advice can result in serious injury or death.

WARNING

This heading warns of situations which could result in injury for persons or damage to things.

CAUTION

To this advice can appear a danger for persons as well as for things, for which can appear situations bringing material damage to things.

IMPORTANT

NOTE

ATTENTION

These headings refer to information which will assis you in the correct use of the machine and/or accessories.

SYMBOLS (for all MOSA models)

STOP - Read absolutely and be duly attentive

Read and pay due attention

GENERAL ADVICE - If the advice is not respected damage can happen to persons or things.

HIGH VOLTAGE - Attention High Voltage.There can be parts in voltage, dangerous to touch. The non observance of the advice implies life danger.

FIRE - Danger of flame or fire. If the advice is not respected fires can happen.

HEAT - Hot surfaces. If the advice is not respected burns or damage to things can be caused.

EXPLOSION - Explosive material or danger of explosion. in general. If the advice is not respected there can be explosions.

WATER - Danger of shortcircuit. If the advice is not respected fires or damage to persons can be caused.

SMOKING - The cigarette can cause fire or explosion. If the advice is not respected fires or explosions can be caused.

ACIDS - Danger of corrosion. If the advice is not respected the acids can cause corrosions with damage to persons or things.

WRENCH - Use of the tools. If the advice is not respected damage can be caused to things and even to persons.

PRESSION - Danger of burns caused by the expulsion of hot liquids under pressure.

ACCES FORBIDDEN *to non authorizad* peaple.

PROHIBITIONS No harm for persons

Use only with safety clothing -

It is compulsory to use the personal protection means given in equipment.

Use only with safety clothing -

It is compulsory to use the personal protection means given in equipment.

Use only with safety protections -

It is a must to use protection means suitable for the different welding works.

Use with only safety material -

It is prohibited to use water to quench fires on the electric machines.

Use only with non inserted voltage -

It is prohibited to make interventions before having disinserted the voltage.

No smoking -

It is prohibited to smoke while filling the tank with fuel.

No welding -

It is forbidden to weld in rooms containing explosive gases.

ADVICE No harm for persons and things

Use only with safety tools, adapted to the specific use -

It is advisable to use tools adapted to the various maintenance works.

Use only with safety protections, specifically suitable

It is advisable to use protections suitable for the different welding works.

Use only with safety protections -

It is advisable to use protections suitable for the different daily checking works.

Use only with safety protections -

It is advisable to use all protections while shifting the machine.

Use only with safety protections -

It is advisable to use protections suitable for the different daily checking works.and/or of maintenance.

The installation and the general advice concerning the operations, are finalized to the correct use of the machine, in the place where it is used as generator group and/or welder.

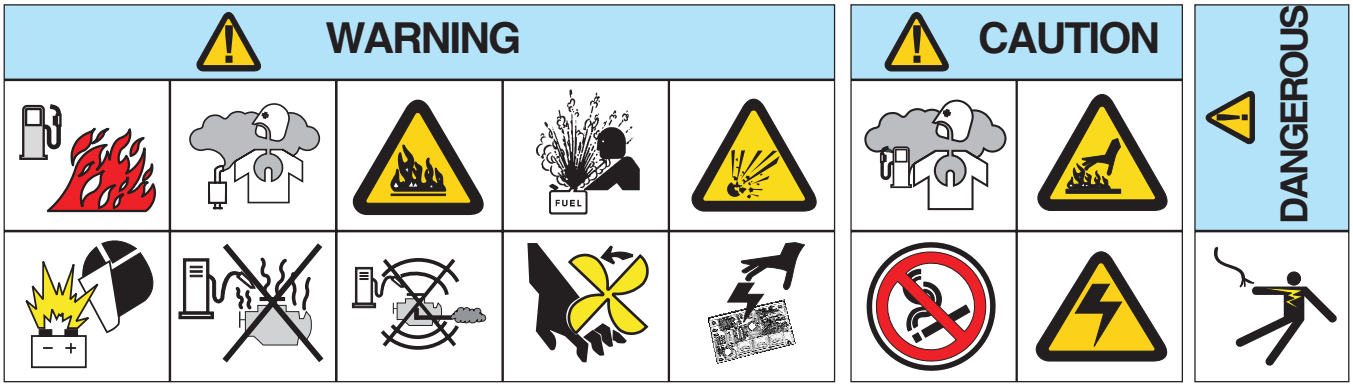
ENGINE	CHECKING BOARD
Stop engine when fueling	Do not touch electric devices if you are barefoot or with wet clothes.
Do not smoke, avoid flames, sparks or electric tools when fueling.	
Unscrew the cap slowly to let out the fuel vapours.	Always keep off leaning surfaces during work operations
Slowly unscrew the cooling liquid tap if the liquid must be topped up.	
The vapor and the heated cooling liquid under pressure can burn face, eyes, skin.	Static electricity can demage the parts on the circuit.
Do not fill tank completely.	
Wipe up spilled fuel before starting engine.	An electric shock can kill
Shut off fuel of tank when moving machine (where it is assembled).	
Avoid spilling fuel on hot engine.	
Sparks may cause the explosion of battery vapours	

☞ **FIRST AID.** In case the operator shold be sprayed by accident, from corrosive liquids a/o hot toxic gas or whatever event which may cause serious injuries or death, predispose the first aid in accordance with the ruling labour accident standards or of local instructions.

Skin contact	Wash with water and soap
Eyes contact	Irrigate with plenty of water, if the irritation persists contact a specialist
Ingestion	Do not induce vomit as to avoid the intake of vomit into the lungs, send for a doctor
Suction of liquids from lungs	If you suppose that vomit has entered the lungs (as in case of spontaneous vomit) take the subject to the hospital with the utmost urgency
Inhalation	In case of exposure to high concentration of vapours take immediately to a non polluted zone the person involved

☞ **FIRE PREVENTION.** In case the working zone,for whatsoever cause goes on fire with flames liable to cause severe wounds or death, follow the first aid as described by the ruling norms or local ones.

EXTINCTION MEANS	
Appropriated	Carbonate anhydride (or carbon dioxyde) powder, foam, nebulized water
Not to be used	Avoid the use of water jets
Other indications	Cover eventual shedding not on fire with foam or sand, use water jets to cool off the surfaces close to the fire
Particular protection	Wear an autorespiratory mask when heavy smoke is present
Useful warnings	Avoid, by appropriate means to have oil sprays over metallic hot surfaces or over electric contacts (switches,plugs,etc.). In case of oil sprinkling from pressure circuits, keep in mind that the inflamability point is very low.



WARNING ***THE MACHINE MUST NOT BE USED IN AREAS WITH EXPLOSIVE ATMOSPHERE***

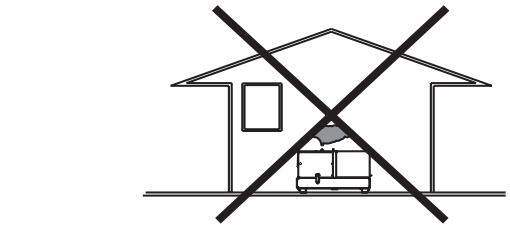
INSTALLATION AND ADVICE BEFORE USE

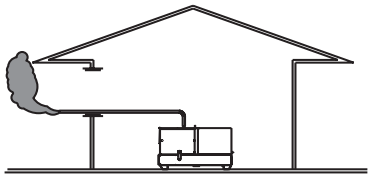
GASOLINE ENGINES

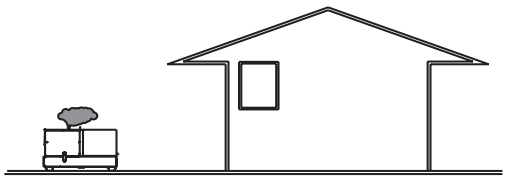
- Use in open space, air swept or vent exhaust gases, which contain the deathly carbone oxyde, far from the work area.

DIESEL ENGINES

- Use in open space, air swept or vent exhaust gases far from the work area.

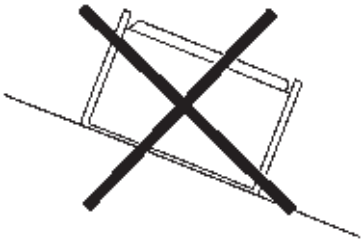




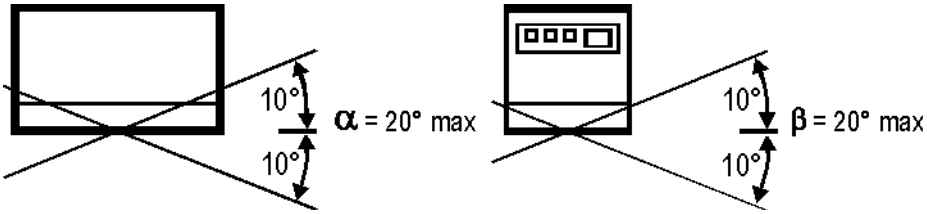


POSITION

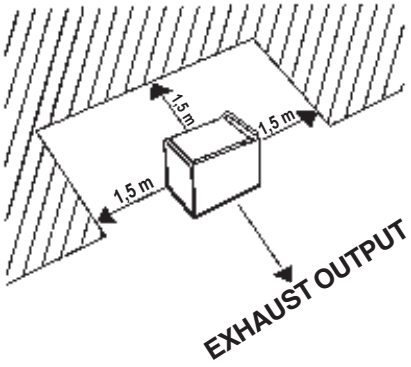
Place the machine on a level surface at a distance of at least 1,5 m from buildings or other plants.



Maximum leaning of the machine (in case of dislevel)



Check that the air gets changed completely and the hot air sent out does not come back inside the set so as to cause a dangerous increase of the temperature.



☞ Make sure that the machine does not move during the work: **block** it possibly with tools and/or devices made to this purpose.

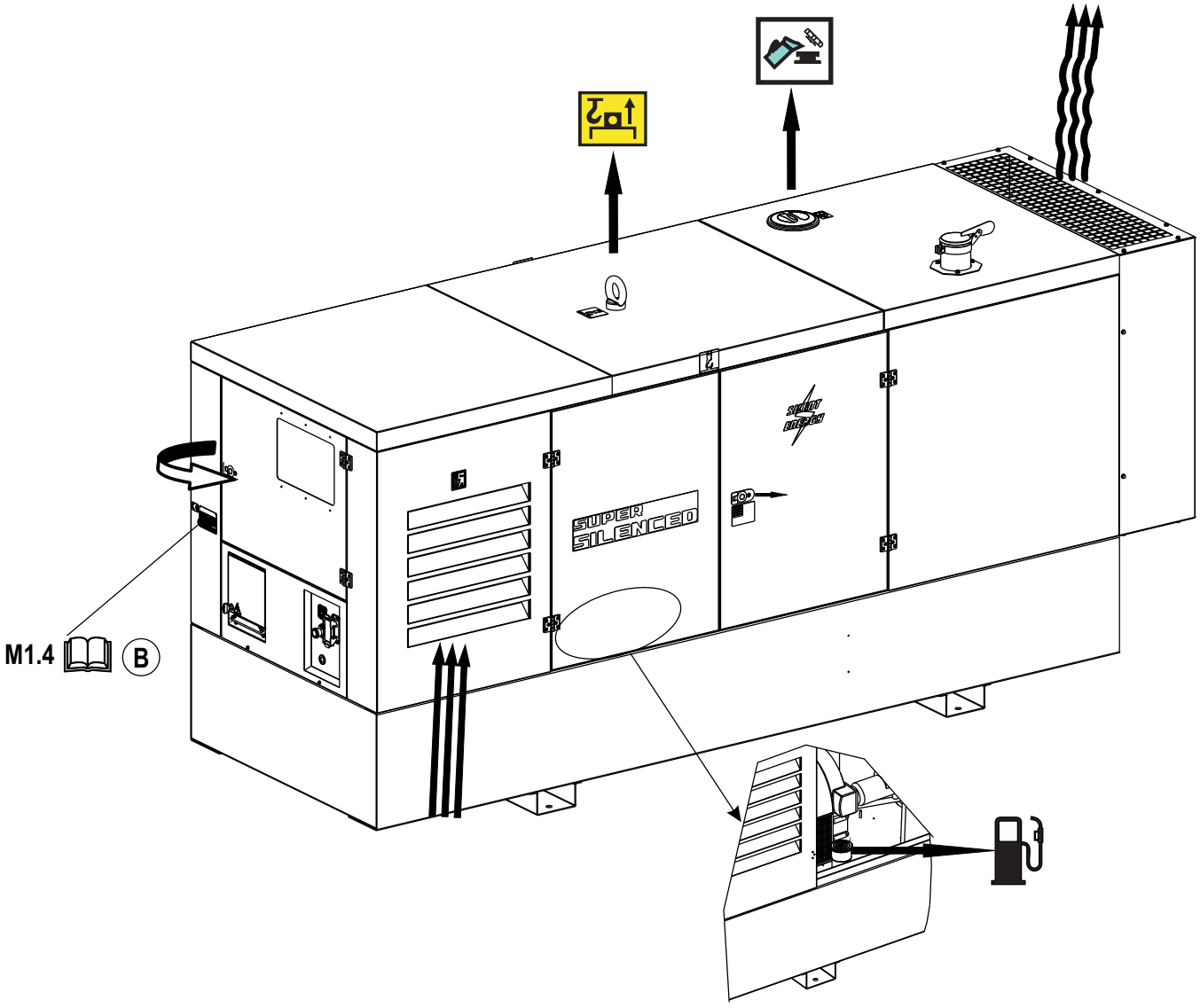
MOVES OF THE MACHINE

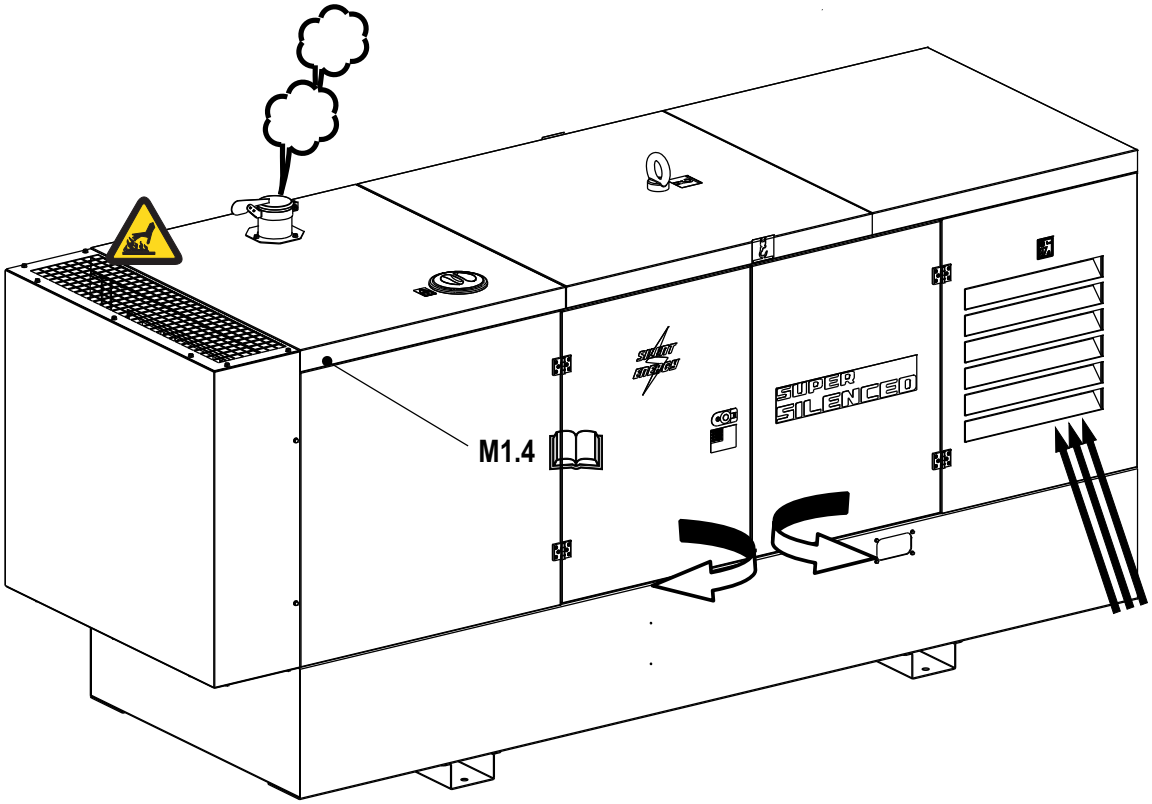
☞ At any move check that the engine is **off**, that there are no connections with cables which impede the moves.

PLACE OF THE MACHINE

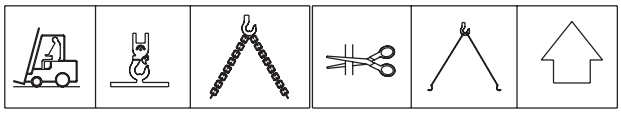
ATTENTION

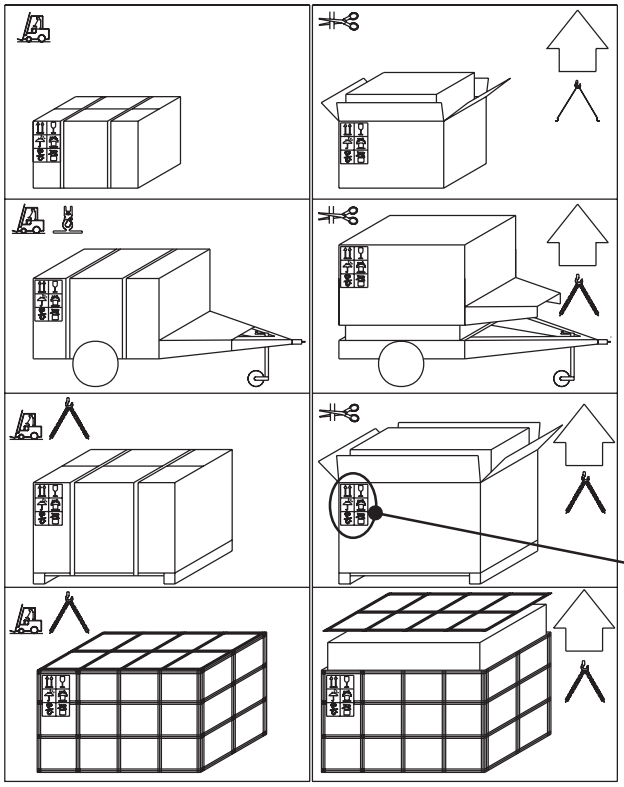
For a safer use from the operator **DO NOT** fit the machine in locations with high risk of flood.
Please do not use the machine in weather conditions which are beyond IP protection shown both in the data plate and on page named "technical data" in this same manual.





NOTE



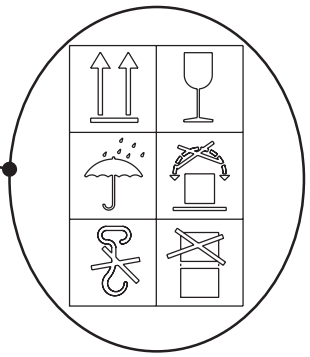


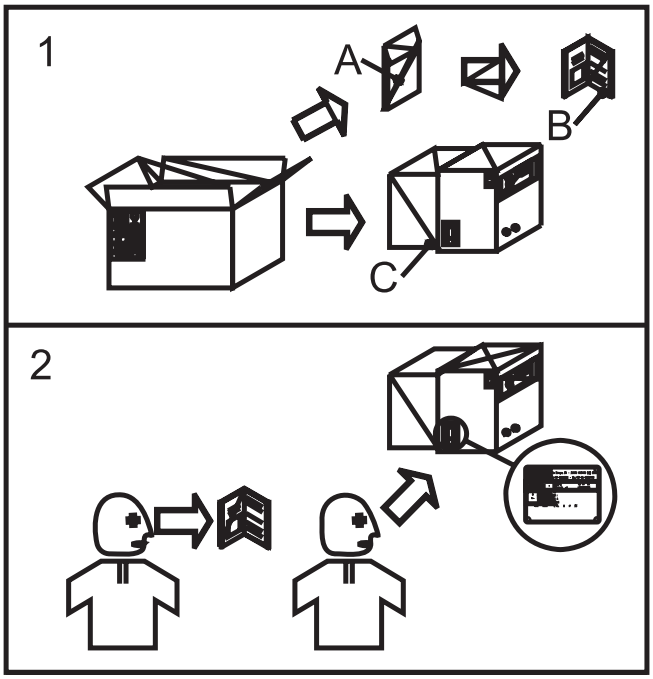
☞ Be sure that the lifting devices are: correctly mounted, adequate for the weight of the machine with it's packaging, and conforms to local rules and regulations.

When receiving the goods make sure that the product has not suffered damage during the transport, that there has not been rough handling or taking away of parts contained inside the packing or in the set.

In case you find damages, rough handling or absence of parts (envelopes, manuals, etc.), we advise you to inform immediately our Technical Service.

For eliminating the packing materials, the User must keep to the norms in force in his country.



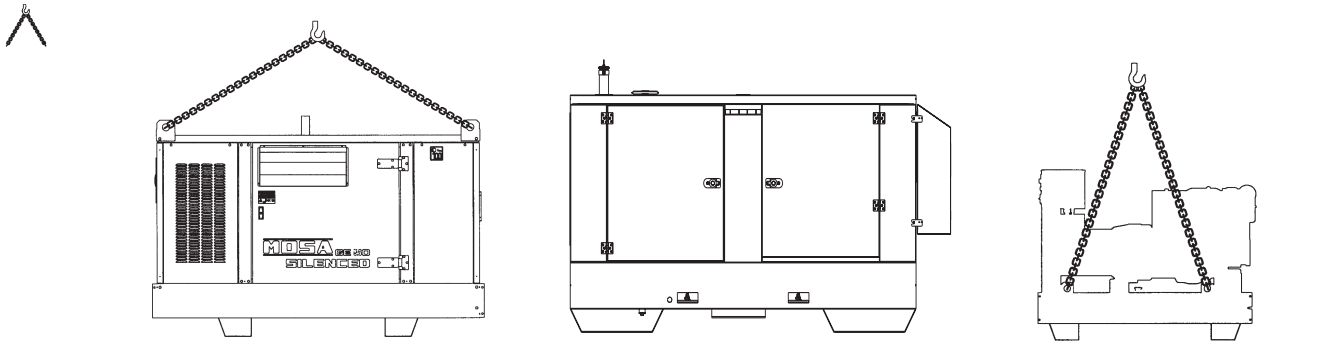


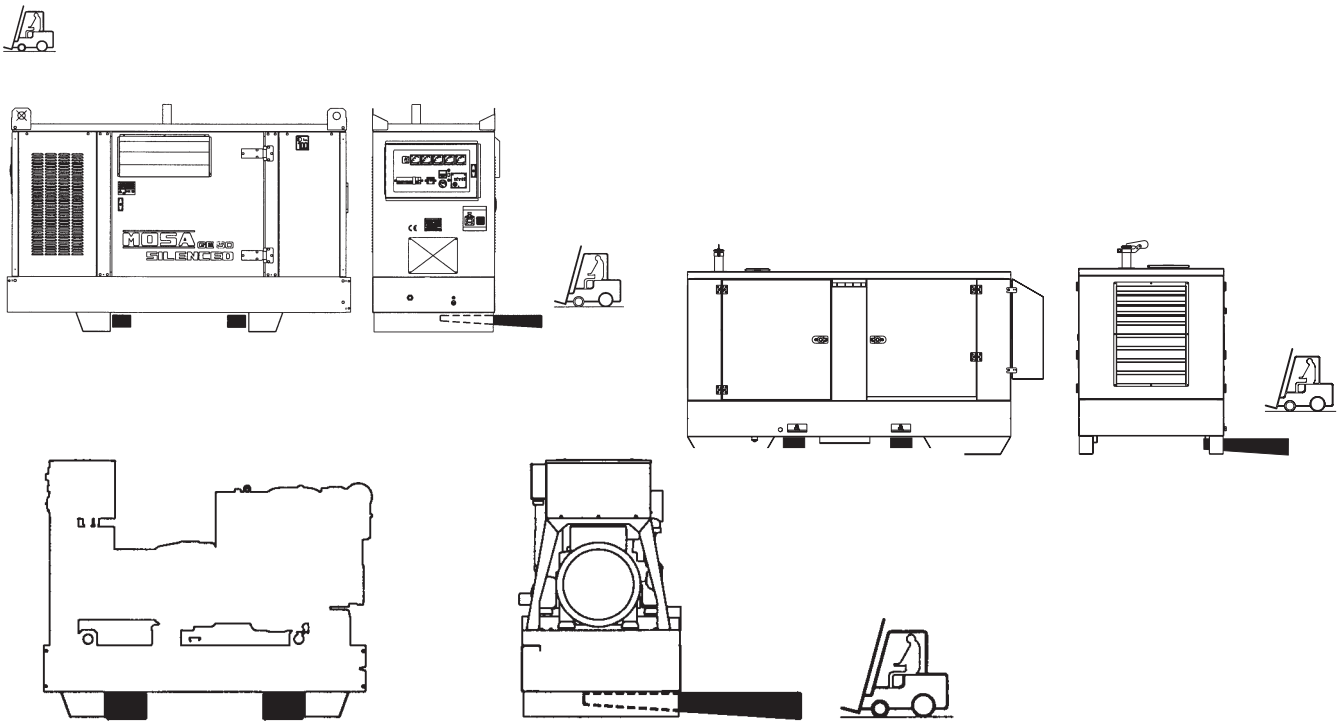
1) Take the machine (C) out of the shipment packing. Take out of the envelope (A) the user's manual (B).
2) Read: the user's manual (B), the plates fixed on the machine, the data plate.

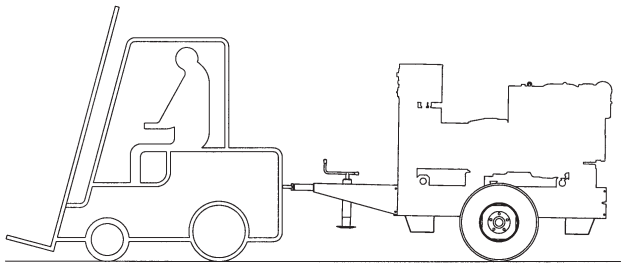
NOTE

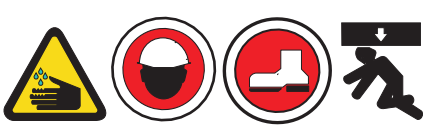
In case you should transport or move the machine, keep to the instructions as per the figures.
Make the transportation when the machine has **no** petrol in its tank, **no** oil in the engine and and electrolyte in the battery.
Be sure that the lifting devices are: correctly mounted, adequate for the weight of the machine with it's packaging, and conform to local rules and regulations.
Only authorized persons involved in the transport of the machine should be in the area of movement.

DO NOT LOAD OTHER PARTS WHICH CAN MODIFY WEIGHT AND BARICENTER POSITION.
IT IS STRICTLY FORBIDDEN TO DRAG THE MACHINE MANUALLY OR TOW IT BY ANY VEHICLE (model with no CTL accessory).
If you did not keep to the instructions, you could damage the structure of the machine.









BATTERY WITHOUT MAINTENANCE

Connect the cable + (positive) to the pole + (positive) of the battery (after having taken away the protection), by properly tightening the clamp.

Check the state of the battery from the colour of the warning light which is in the upper part.

- Green colour: battery OK
- Black colour: battery to be recharged
- White colour: battery to be replaced

DO NOT OPEN THE BATTERY.

LUBRICANT

RECOMMENDED OIL
MOSA recommends selecting **AGIP** engine oil.
Refer to the label on the motor for the recommended products.

Please refer to the motor operating manual for the recommended viscosity.

REFUELLING AND CONTROL:
Carry out refuelling and controls with motor at level position.

1. Remove the oil-fill tap (24)
2. Pour oil and replace the tap
3. Check the oil level using the dipstick (23); the oil level must be comprised between the minimum and maximum indicators.

ATTENTION

It is dangerous to fill the motor with too much oil, as its combustion can provoke a sudden increase in rotation speed.

AIR FILTER

Check that the dry air filter is correctly installed and that there are no leaks around the filter which could lead to infiltrations of non-filtered air to the inside of the motor.

FUEL

ATTENTION

Do not smoke or use open flames during refuelling operations, in order to avoid explosions or fire hazards.
Fuel fumes are highly toxic; carry out operations outdoors only, or in a well-ventilated environment.

Avoid accidentally spilling fuel. Clean any eventual leaks before starting up motor.

Refill the tank with good quality diesel fuel, such as automobile type diesel fuel, for example.

For further details on the type of diesel fuel to use, see the motor operating manual supplied.

Do not fill the tank completely; leave a space of approx. 10 mm between the fuel level and the wall of the tank to allow for expansion.

In rigid environmental temperature conditions, use special winterized diesel fuels or specific additives in order to avoid the formation of paraffin.

COOLING LIQUID

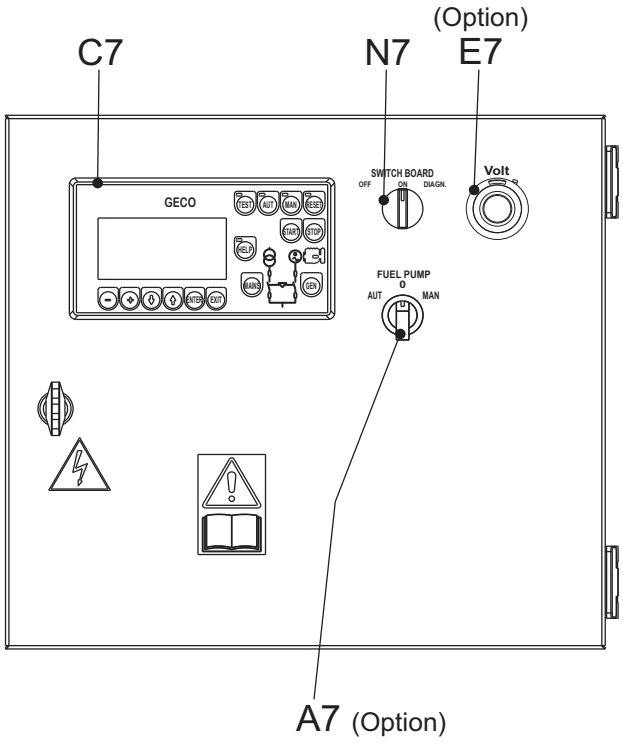
ATTENTION

Do not remove the radiator tap with the motor in operation or still hot, as the liquid coolant may spurt out and cause serious burns. Remove the tap very carefully.

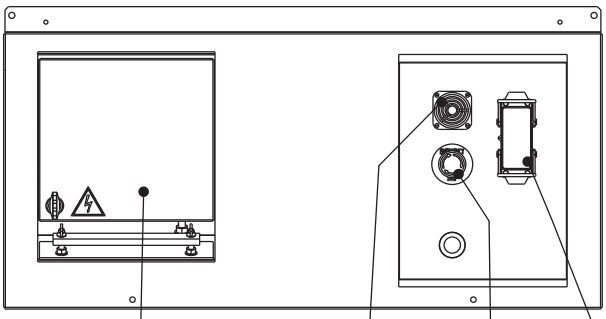
Remove the tap and pour the liquid coolant into the radiator; the quantity and composition of the liquid coolant are indicated in the motor operating manual.
Replace the tap, ensuring it is perfectly closed.
After refilling operations, allow the motor to run for a brief time and check the level, as it may have diminished due to air bubbles present in the cooling circuit; restore the level with water.
To replace the liquid coolant, follow the operations described in the motor operating manual.

GROUNDING CONNECTION

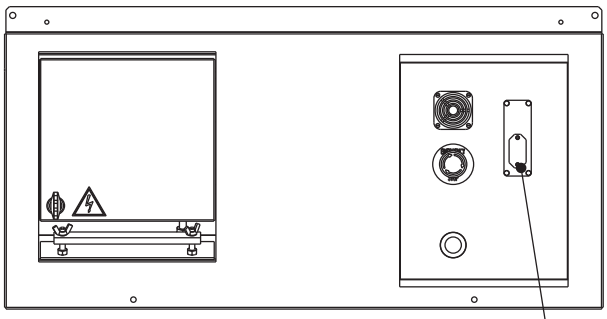
The grounding connection to an earthed installation **is obligatory** for all models equipped with a differential switch (circuit breaker). In these groups the generator star point is generally connected to the machine's earthing; by employing the TN or TT distribution system, the differential switch guarantees protection against indirect contacts.
In the case of powering complex installations requiring or employing additional electrical protection devices, the coordination between the protection devices must be verified.
For the grounding connection, use the terminal (12); comply to local and/or current regulations in force for electrical installations and safety.



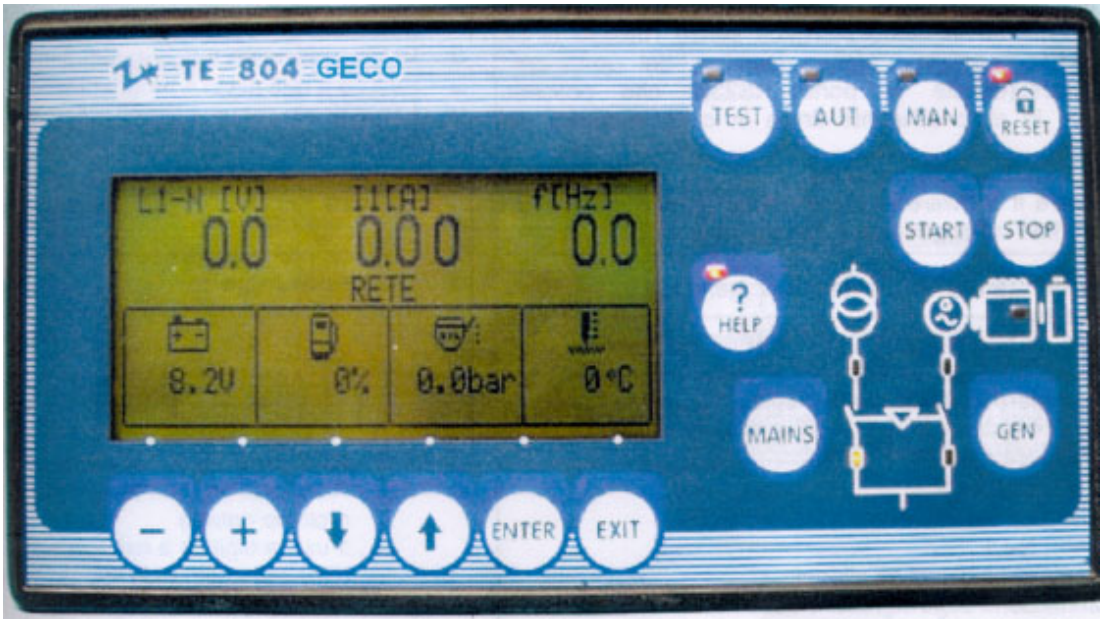
AUTOMATIC VERSION



MANUAL VERSION



Pos.	Descrizione	Description	Description	Descripción
Q3	Muffola	Output power unit	Planche à bornes prélèv. puissance	Terminal obtención potencia
R3	Avvisatore acustico	Electric siren	Avertisseur sonore	Sirena
L5	Pulsante stop emergenza	Emergency stop button	Bouton d'urgence	Pulsador emergencia
D6	Connettore PAC	Connector, PAC	Connecteur PAC	Conector PAC
A7	Selettore travaso pompa AUT-0-MAN	Transfer pump selector AUT-0-MAN	Sélecteur transvasement pompe AUT-0-MAN	Selector trasvase bomba AUTO/0/MAN
C7	Controllo gruppo elettr. "GECO"	"GECO" generating set test	Contrôle groupe électrogene "GECO"	Control grupo electrógeno "GECO"
E7	Potenz. regolatore di tensione	Voltmeter regulator	Potentiomètre régulateur de tension	Potenc. regulador de tensión
N7	Selettore OFF-ON-DIAGN.	OFF-ON-DIAGN. selector	Sélecteur OFF-ON DIAGN	Selector OFF-ON DIAGN
S7	Spina 230V monofase	Plug 230V singlephase	Fiche 230V monophasée	Enchufe 230V monofásico



INTRODUCTION

The "GECO" equipment entails a control unit for absolutely modern generators. Its strong holds are the following:

- Large-size graphical display (95x45 mm) to be able to display all the electrical parameters at the same time (with characters of 10mm).
- The membrane keyboard has built-in keys with relative indicator LEDs. It also offers a high degree of reliability and ideal touch-sensitive keys.
- The HELP key with relative LED that flashes to point out that a message is to be read
- The use of the dater clock to set the weekly TEST and to display all the events that occur and that may be shown on the Display.
- The control of 4 different mains/generator line systems:
  - N-L1-L2-L3
  - L1-L2-L3
  - L1-N-L2 (AMERICAN market)
  - N-L1
- Operational temperature range from -20 to + 60°C
- Protection rating IP64
- 5 possible languages: Italian-English-French-German-Spanish
- Generator protection against OVERLOADS and SHORT-CIRCUITS with setting of the rated current of the generator, setting of the short-circuit current in percentage of the rated current value of the generator and a tripping delay timing of the protection device in tenths of a second.

Parameters Displayed

The LCD shows data and information in graphic and alphanumeric forms. Press the "⇓" or "⇑" keys to view the data pages. Press the "**–**" or "**+**" keys to see alternative data on the same page.
N.B. on the display it appears MAINS or GENERATOR for showing to whom the measure are referred.

The measure on the display are the followings:

- Battery voltage
- Mains and phase generator voltages, between the lines and of the system
- Phase currents
- Phase and total active, reactive and apparent powers.
- Active, reactive and apparent energy.
- P.F. - Power factor of each phase.
- Energy contact maker
- Frequency of the generator.
- Oil pressure instrument
- Water temperature instrument
- Fuel level instrument
- Engine RPM
- Number of successful starting attempts
- Number of failed starting attempts
- Number of total starting attempts
- Total hours of use
- Partial hours of use
- Hours left to maintenance

KEYBOARD

HELP key – The illuminated LED means a help message is available. By pressing the key, a help message concerning the current operation is displayed.
ENTER and **EXIT keys -** Press ENTER to confirm operations or to enter the menu. Press EXIT to refuse an operation or to exit a menu and help message.
"⇓" and "⇑" arrow keys – Press these keys to shift to the different pages of data display or to select parameters.
"–" and "+" keys – Press these keys to display alternative data of the selected data page or to modify the parameters.
OFF/RESET, MAN, AUT and TEST keys – Press these keys to select the operating mode. The illuminated LED indicates the selected operating mode; if it is flashing, remote control is active.

03/09/02 84275-GB

START and **STOP keys –** These work in MAN operating mode only, used to start and stop the engine. By quickly pressing the START key, one start attempt takes place; by keeping the START key pressed, the duration of the start attempts can be extended. The flashing LED of the engine symbol denotes engine started, with alarms inhibited; and is constantly on at the end of the alarms inhibition time. The engine can be stopped using the OFF/RESET key.
MAINS and **GEN keys –** They work in MAN operating mode only, used to switch the load from mains to generator and vice versa. The illuminated LEDs of the mains and generator symbols indicate the respective voltages are within preset limits. The illuminated LEDs of the changeover symbols indicate the actual closing of switching devices; when flashing, there is a incorrect feed-back signal for the actual closing or opening of the switching devices.

OPERATING MODE

OFF/RESET mode – The engine can not operate. If the mains is present, the load is switched to the mains. Changing from TEST, AUT or MAN to the OFF/RESET mode and if the engine is running, the engine is immediately stopped and eventual alarms are reset. If the cause of the alarm is still present, it can not be reset.
MAN mode – The engine can be manually started or stopped using the START and STOP keys only in addition to load switching from mains to generator and vice versa, by means of the MAINS and GEN keys. Always in MAN mode, at the start command and by keeping the key pressed, the preset starting time can be prolonged while at the stop command and by keeping the key pressed for more than 6 seconds, the fuel valve is discharged for 4 minutes.
AUT mode – In case of mains not present (out of the preset limits), the engine automatically starts or stops when the mains returns.
TEST mode – The engine immediately starts even if the mains is present. In case the mains is not present, the load is switched to the generator. Changing to the AUT mode and if the mains is present, the engine will stop.

Alarms

When an alarm arises, the lower section of the display is used to view it. In case of two alarms or more, they are individually shown in sequence. A help message is available for every alarm, in order to locate the possible alarm source. Alarm conditions can be reset by means of the OFF/RESET key, that prevent any unintentional engine starting at the alarm reset operation. If the alarm does not reset, this means the cause of the alarm is still present. During event-log sessions and set-up operations, no alarms are viewed.

LIST OF THE ALARMS GECO

A01 Engine temperature warning (analog sensor)
A02 High engine temperature (analog sensor)
A03 Temperature analog sensor fault
A04 High engine temperature (digital sensor)
A05 Oil pressure warning(analog sensor)
A06 Low oil pressure (analog sensor)
A07 Pressure analog sensor fault
A08 Low oil pressure (digital sensor)
A09 Pressure digital sensor fault
A10 Fuel level warning(analog sensor)
A11 Low fuel level(analog sensor)
A12 Level analog sensor fault
A13 Low fuel level(digital sensor)
A14 High battery voltage
A15 Low battery voltage
A16 Inefficient battery
A17 Charger alternator failure
A18 “W” signal failure
A19 Low engine “W” speed
A20 High engine “W” speed
A21 Starting failure
A22 Emergency stop
A23 Unexpected stop
A24 Engine stop failure
A25 Low generator frequency
A26 High generator frequency
A27 Low generator voltage
A28 High generator voltage
A29 Generator asymmetry
A30 Generator short-circuit
A31 Generator overload
A32 External generator protection tripping
A33 Incorrect generator phase sequence
A34 Incorrect mains phase sequence
A35 Wrong system frequency setting
A36 Generator contactor failure
A37 Mains contactor failure
A38 Maintenance requested
A39 System error
A40 Fuel transfer empty
A41 Fuel transfer too full
A42 Rent hours exhausted

UA1 Earth leakage relay protection
UA2 User’s alarm 2
UA3 User’s alarm 3
UA4 User’s alarm 4

N.B.: MOSA enables the alarms and sets their intervention characteristics according to the type of generating set.

TECHNICAL CHARACTERISTICS GECO

Power supply

Battery rated voltage	12 or 24VDC indifferently
Voltage range	9÷33VDC
Minimum voltage at the starting	6,7VDC
Maximum current consumption	320mA at 12VDC and 160mA at 24VDC
Stand-by current	150mA at 12VDC and 75mA at 24VDC
Micro interruption immunity	200ms

Digital input

Input type	negative
Current input	≤10mA
Input “low” voltage	≤1,5V (typical 2,9V)
Input “high” voltage	≥5,3V (typical 4,3V)
Input delay	≥50ms

Speed input “W”

Input type	AC coupling
Voltage range	5÷50Vpp
Frequency range	40÷2000Hz

Engine running input (500rpm) for permanent magnet generator

Voltage range	0÷40VAC

Engine running input (500rpm) for pre-excited generator

Voltage range	0÷40VDC
Maximum input current	12mA
Maximum voltage at +D terminal	12 or 24VDC (battery voltage)
Pre-excitation current	170mA at 12VDC or 130mA at 24VDC

Relay output 4.1-4.2 / 4.3-4.4 terminals (voltage free)

Contact type	1 NC for mains 1 NO for generator
Rated voltage	250VAC (440VAC max)
Rated current at 250VAC	8A AC1 (2A AC15)

Relay output 5.3-5.4-5.5 terminals (voltage free)

Contact type	1 changeover
Rated voltage	250VAC max
Rated current at 250VAC	8A AC1 (2A AC15)

Relay output 6.2 / 6.3 / 6.4 / 6.5 terminals (+ battery voltage output)

Contact type	1 NO
Rated voltage	30VDC
Rated current at 30VDC	5A DC1

Analog inputs

Pressure sensor current	20mA max
Temperature sensor current	7mA max
Level sensor current	10mA max
Analog ground voltage	-0,5V÷+0,5V

Voltage inputs

Maximum rated voltage Ue	480VAC L-L (277VAC L-N)
Measuring range	50÷620V L-L (358VAC L-N)
Frequency range	45 ÷65Hz
Measuring method	True RMS
Measuring input impedance	>1,1MW L-L >570kW L-N
Wiring mode	1, 2 or 3 phases, with or without neutral

Current inputs

Rated current Ie	5A
Measuring range	0,02÷6A
Measuring method	True RMS
Overload capacity	+20% Ie
Overload peak	50A for 1 second
Power consumption	<0,3VA

Measuring charateristics (-10÷+45°C)

Voltage	±1% ±1digit
Frequency	±0,2% ±1digit
Current	±1% ±1digit
Power	±2% ±1digit
Energy	±2% ±1digit

Ambient operating conditions

Operating temperature	-20÷+60°C
Storage temperature	-30÷+80°C
Relative humidity	<90%
Maximum pollution degree	3

Connections

Terminal type	Plug-in
Cable cross section (min e max)	**0,2÷2,5 mmq (24÷12 AWG)**
Tightening torque	0,8 Nm (7 LBin)

Housing

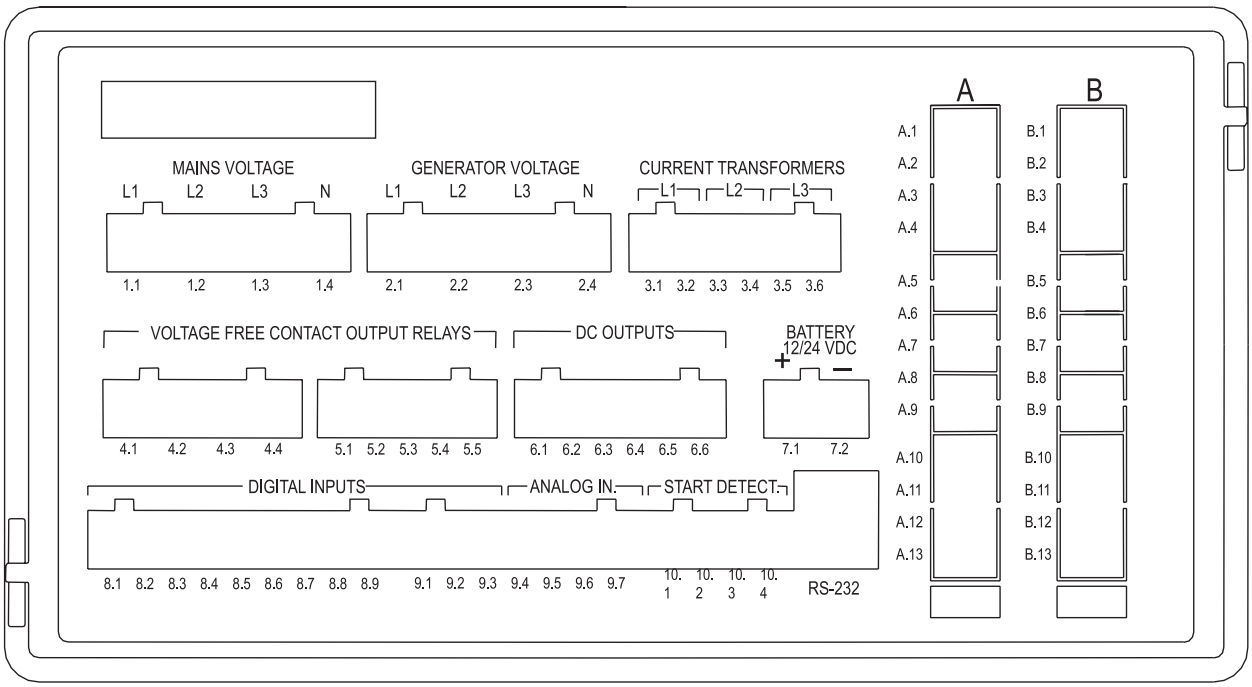
Version	Flush mount
Dimensions	196,5x106,5x120mm
Panel cutout	181x91mm
Material	Noryl SE100 thermoplastic
Degree of protection	IP64 on front
Weight	750g

03/09/02 84275-GB

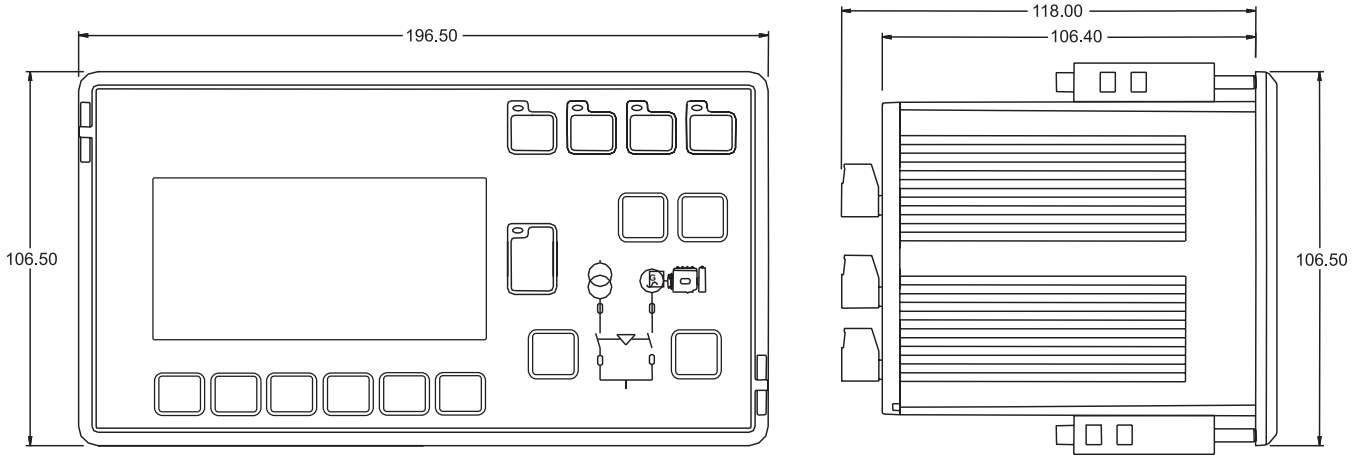
ACQUIRED HOMOLOGATIONS GECO

Type of test/check	Reference standard / regulation	Test parameters
Functional characteristics test	IEC/EN 60255-6 ('94)	Sect. 3, par. 13 of the standard
Heating test	IEC/EN 60255-6 ('94)	Sect. 3, par. 15 of the standard
Electrical tests	IEC 60664-1 ('92)	• 4 kV (1.2/50 □s): 3 pulses + and 3 pulses – with gap of at least 1 s • 2500 (50Hz): 1 min.
EMC test		
▪ Imunity tests		
➢ Surges	IEC/EN 61000-4-5 ('95)	2kV (CM) - 1kV (DM)
➢ fast transient/bursts	IEC/EN 61000-4-4 ('95)	2kV on power supply and output - 1 kV on controls
➢ irradiated electro-magnetic field	IEC/EN 61000-4-3 ('96)	10 V/m
➢ driver electro-magentic field	IEC/EN 61000-4-6 ('96)	10V
➢ Electrostatic discharge	IEC/EN 60255-22-2 ('96)	8kV (air) - 6kV (contact)
▪ Emission tests		
➢ Radiofrequency driver emission	IEC/EN 55011 ('98)	class A of the standard
➢ Radiofrequency irradiated emission	IEC/EN 55011 ('98)	class A of the standard
Collision	IEC/EN 60255-21-2 ('95)	class 2 of the standard
Sinusoidal vibrations	IEC/EN 60068-2-6 (LLOYD)	V1
Salty mist	RINA regulation (sect. E chap. 3) or IEC/EN 60068-2-52 ('96)	According to RINA regulation (past edition) or level 2 of the standard
Z/ABDM climatic sequence	IEC/EN 60068-2-61 ('93)	Temperatures according to storage limits and operational limits

Terminal board connections (seen from rear)



Overall dimensions



WARNING

It is absolutely forbidden to connect the unit to the public mains and/or another electrical power source .

Access forbidden to area adjacent to electricity-generating group for all non-authorized personnel.

The electricity-generating groups are to be considered electrical energy producing stations.
The dangers of electrical energy must be considered together with those related to the presence of chemical substances (fuels, oils, etc.), rotating parts and waste products (fumes, discharge gases, heat, etc.).

GENERATION IN AC (ALTERNATING CURRENT)

Before each work session check the efficiency of the ground connection for the electricity-generating group if the distribution system adopted requires it, such as, for example, the TT and TN systems.

Check that the electrical specifications for the units to be powered - voltage, power, frequency - are compatible with those of the generator. Values that are too high or too low for voltage and frequency can damage electrical equipment irreparably.
In some cases, for the powering of three-phase loads, it is necessary to ensure that the cyclic direction of the phases corresponds to the installation's requirements.

Connect the electric devices to be powered to the AC sockets, using suitable plugs and cables in prime condition.

Before starting up the group, make certain no dangerous situations exist on the installation to be powered.
Check that the thermal-magnetic switch (Z2) is in the OFF position (input lever in downward position).

Start up the electricity-generating group, positioning the thermal-magnetic switch (Z2) and differential switch (D) to ON (input lever in upward position).
Before powering on the utilities, check that the voltmeter (N) and frequency meter (E2) indicate nominal values; in addition, check on the voltmeter change-over switch (H2) (where it is assembled) that the three line voltages are the same.
☞ In the absence of a load, the values for voltage and frequency can be greater than their nominal values. See sections on VOLTAGE and FREQUENCY.

OPERATING CONDITIONS

POWER

The electrical power expressed in kVA on an electricity-generating group is the available output power to the reference environmental conditions and nominal values for: voltage, frequency, power factors (cos φ).

There are various types of power: PRIME POWER (PRP), STAND-BY POWER established by ISO 8528-1 and 3046/1 Norms, and their definitions are listed in the manual's TECHNICAL SPECIFICATIONS page.

☞ During the use of the electricity-generating group **NEVER EXCEED** the power indications, paying careful attention when several loads are powered simultaneously.

VOLTAGE

GENERATORS WITH COMPOUND SETTING.

In these types of generators, the no-load voltage is generally greater than 3–5% with respect to its nominal value; f.e. for nominal voltage, threephase 400Vac or singlephase 230Vac, the no-load voltage can be comprised between 410-420V (threephase) and 235-245V (singlephase). The precision of the load voltage is maintained within ±5% with balanced loads and with a rotation speed variation of 4%. Particularly, with resistive loads (cos φ = 1), a voltage over-elevation occurs which, with the machine cold and at full load, can even attain +10 %, a value which in any case is halved after the first 10-15 minutes of operation.
The insertion and release of the full load, under constant rotation speed, provokes a transitory voltage variation that is less than 10%; the voltage returns to its nominal value within 0.1 seconds.

GENERATORS WITH ELECTRONIC SETTING (A.V.R.).

In these types of generators, the voltage precision is maintained within ±1,5%, with speed variations comprised from -10% to +30%, and with balanced loads. The voltage is the same both with no-load and with load; the insertion and release of the full load provokes a transitory voltage variation that is less than 15%; the voltage returns to its nominal value within 0.2–0.3 seconds.

FREQUENCY

The frequency is a parameter that is directly dependent on the motor's rotation speed. Depending on the type of alternator, 2 or 4 pole, we will have a frequency of 50/60 Hz with a rotation speed of 3000/3600 or 1500/1800 revolutions per minute.
The frequency, and therefore the number of motor revolutions, is maintained constant by the motor's speed regulation system.
Generally, this regulator is of a mechanical type and presents a droop from no-load to nominal load which is less than 5 % (static or droop), while under static conditions precision is maintained within ±1%.Therefore, for generators at 50Hz the no-load frequency can be 52–52.5 Hz, while for generators at 60Hz the no-load frequency can be 62.5-63Hz.

In some motors or for special requirements the speed regulator is electronic; in these cases, precision under static operating conditions attains ±0.25%, and the frequency is maintained constant in operation from no-load to load (isochronal operation).

POWER FACTOR - COS φ

The power factor is a value which depends on the load's electrical specifications; it indicates the ratio between the Active Power (kW) and Apparent Power (kVA). The apparent power is the total power necessary for the load, achieved from the sum of the active power supplied by the motor (after the alternator has transformed the mechanical power into electrical power), and the Reactive Power (kVAR) supplied by the alternator. The nominal value for the power factor is cos φ = 0,8; for different values comprised between 0.8 and 1 it is important during usage not to exceed the declared active power (kW), so as to not overload the electricity-generating group motor; the apparent power (kVA) will diminish proportionally to the increase of cos φ.
For cos φ values of less than 0.8 the alternator must be downgraded, since at equal apparent power the alternator should supply a greater reactive power. For reduction coefficients, contact the Technical Service Department.

START-UP OF ASYNCHRONOUS MOTORS

The start-up of asynchronous motors from an electricity-generating group can prove critical because of high start-up currents the asynchronous motor requires (I start-up = up to 8 times the nominal current In.). The start-up current must not exceed the alternator's admissible overload current for brief periods, generally in the order of 250–300% for 10–15 seconds.
To avoid a group oversize, we recommend following these precautionary measures:

- in the case of a start-up of several motors, subdivide the motors into groups and set up their start-up at intervals of 30–60 seconds.
- when the operating machine coupled to the motor allows it, see to a start-up with reduced voltage, star point/triangle start-up or with autotransformer, or use a soft-start system.

In all cases, when the user circuit requires the start-up of an asynchronous motor, it is necessary to check that there are no utilities inserted into the installation, which in the case of a voltage droop can cause more or less serious disservices (opening of contact points, temporary lack of power to control and command systems, etc.).

SINGLE-PHASE LOADS

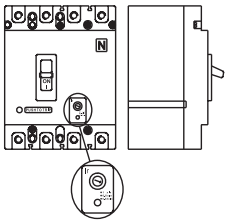
Power to monophase utilities by means of three-phase generators requires some operating limitations.

- In single-phase operation, the declared voltage tolerance can no longer be maintained by the regulator (compound or electronic regulator), since the system becomes highly unbalanced. **The voltage variation on the phases not affected by the power can prove dangerous; we recommend sectioning the other loads eventually connected**.
- The maximum power which can be drawn between Neutral and Phase (start connection) is generally 1/3 of the nominal three-phase power; some types of alternators even allow for 40%. Between two Phases (triangle connection) the maximum power cannot exceed 2/3 of the declared three-phase power.
- In electricity-generating groups equipped with monophase sockets, use these sockets for connecting the loads. In other cases, always use the "R" phase and Neutral.

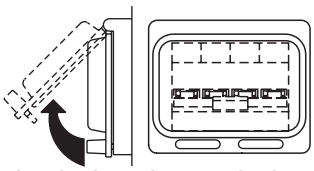
ELECTRIC PROTECTIONS

THERMAL-MAGNETIC SWITCH

The electricity-generating group is protected against short-circuits and against overloads by a thermal-magnetic switch (Z2) situated upstream from the installation. Operating currents, both thermic and magnetic, can be fixed or adjustable in relation to the switch model.
☞ In models with adjustable operating current **do not modify** the settings, since doing so can compromise the installation's protection or the electricity-generating group's output characteristics. For eventual variations, contact our Technical Service Department.



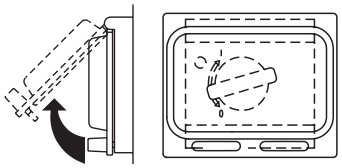
The intervention of the protection feature against overloads is not instantaneous, but follows a current overload/time outline; the greater the overload the less the intervention.
Furthermore, keep in mind that the nominal operating current refers to an operating temperature of 30°C, so that each variation of 10°C roughly corresponds to a variation of 5% on the value of nominal current.

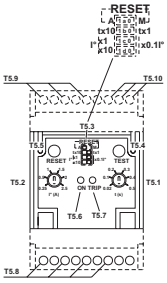


In case of an intervention on the part of the thermal magnetic protection device, check that the total absorption does not exceed the electricity-generating group's nominal current.

DIFFERENTIAL SWITCH

The differential switch or differential relay guarantee protection against indirect contacts due to malfunction currents towards the ground. When the device detects a malfunction current that is higher than the nominal current or the set current, it intervenes by cutting off





power to the circuit connected.

In the case of an intervention by the differential switch, check that there are no sheathing defects in the installation: connection cables, sockets and plugs, utilities connected.

☞ Before each work session, check the operation of the differential protection device by pressing the test key. The electricity-generating group must be in operation, and the lever on the differential switch must be in the ON position.

THERMIC PROTECTION

Generally present to protect against overloads on an individual power socket c.a.

When the nominal operating current has been exceeded, the protection device intervenes by cutting off power to the socket.

The intervention of the protection device against overloads is not instantaneous, but follows a current overload/time outline; the greater the overload the less the intervention.

In case of an intervention, check that the current absorbed by the load does not exceed the protection's nominal operating current.

Allow the protection to cool off for a few minutes before resetting by pressing the central pole.

ATTENTION

Do not keep the central pole on the thermic protection forcefully pressed to prevent its intervention.

USAGE WITH EAS AUTOMATIC START-UP PANEL

The electricity-generating group in combination with the EAS automatic start-up panel forms a unit for distributing electrical energy within a few seconds of a power failure from the commercial electrical power line.

Below is some general operating information; refer to the automatic panel's specific manual for details on installation, command, control and signalling operations.

- ❑ Perform connections on the installation in safety conditions. Position the automatic panel in RESET or LOCKED mode.
- ❑ Carry out the first start-up in MANUAL mode.
  Check that the generator's LOCAL START / REMOTE START switch (I6) is in the REMOTE position.
  Check that the generator switches are enabled (input lever in upward position).
  Position the EAS panel in manual mode by pressing MAN. key, and only after having checked that there are no dangerous situations, press the START key to start the electricity-generating group.
- ❑ During the operation of the generator, all controls and signals from both the automatic panel and group are enabled; it is therefore possible to control its operation from both positions.
  In case of an alarm with a shutdown of the motor (low pressure, high temperature, etc.), the automatic panel will indicate the malfunction that has caused the stoppage, while the generator's front panel will be disabled and will no longer supply any information.

NOTE

Don not intervene on the setting of the protection switch. Before using the machine check the ON warning lamp lighting.

The relay allows to select the tripping current value so as to keep values of contact voltage of the limits indicated by the electrical security norms.

These adjustments allow to perform a tripping selecticity or either current or delay when more relays are located along the same line in protection of the different starting signals.

SW G.F.I.
The SW G.F.I. switch placed inside the electric control panel - or inside the electric box - allows to exclude the differential relay in case of need from the group to be feeded.

WARNING: Have qualified personnel to exclude protection in order to foresee other electrical safety solutions.

USE OF THE DER2 / D2B MODEL (MOSA SET UP)

1) Manual reset
2) Regulation of intervention time: 0.5 seconds
3) Regulation of fault current: 30 mA
4) Output relay: N.De or N.E. according to the model of the machine .

☞ - In order to modify the set up call the Technical Assistance Centres

The GFI is equipped with three tests, two of which are effected automatically by the instrument.

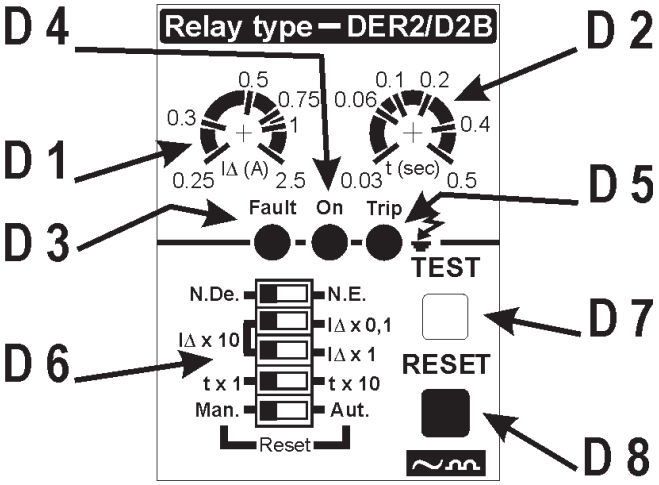
1. manual test (trial push button)
2. automatic test of the toroid/relay connection (guard)
3. automatic test of the board electronics. In case of fault the output relay trips and the Fault led lights with fixed light.

It is able to work correctly even in presence of harmonic distortion or anyway with very disturbed signals.
In case the internal temperature goes over the threshold for a good functioning , the Fault led will twinkle.
Its interruption due to a fault of the toroid (break of the connection wire) or a fault in the internal circuits brings to the automatic intervention of the protection

To help the user in setting up the intervention delay, the potentiometer t(s) rotation in correspondence of a reference mark causes the Fault led to twinkle for a few seconds.

LEGEND:

D1 Potentiometer for earthing fault current regulation
D2 Potentiometer for intervention time regulation
D3 Multifunction led for indication of: internal electronics fault / internal temperature out of range/ t(s) centred correctly.
D4 Led indicating presence of feeding
D5 Led indicating intervention of GFI relay
D6 Micro-switches for setting up of the instrument
D7 Trial push-button
D8 Push-button for the manual reset



Problem	Possible cause	Solution
	ENGINE	
The motor does not start up	1) Start-up switch (I6) (where it is assembled) in incorrect position	1) Check position
	2) Emergency button (L5) pressed	2) Unblock
	3) Preheating (where it is assembled)	3) Lacking or insufficient preheating phase for sparkplugs. Malfunction in circuit: repair.
	4) Engine control unit or starting key faulty.	4) Replace
	5) Battery low	5) Recharge or replace. Check the battery charge circuit on motor and automatic panel.
	6) Battery cable terminals loose or corroded	6) Tighten and clean. Replace if corroded.
	7) Start-up motor defective	7) Repair or replace.
	8) No fuel or air in feed circuit	8) Refill tank, un-aerate the circuit.
	9) Malfunction on feed circuit: defective pump, injector blocked, etc.	9) Ask for intervention of Service Department.
	10) Air filter or fuel filter clogged	10) Clean or replace
	11) Air in the gasoil filter.	11) Take the air out filling the filter with gasoil.
	12) Motor stopping device defective	12) Replace.
	13) Malfunction on electrical power circuit on generator control panel	13) Check and repair.
The motor does not accelerate. Inconstant speed.	1) Air filter or fuel filter clogged.	1) Clean or replace.
	2) Malfunction on feed circuit: defective pump, injector blocked, etc.	2) Ask for intervention of Service Department.
	3) Oil level too high.	3) Eliminate excess oil.
	4) Motor speed regulator defective.	4) Ask for intervention of Service Department
Black smoke	1) Air filter clogged.	1) Clean or replace
	2) Overload.	2) Check the load connected and diminish.
	3) Injectors defective. Injection pump requires calibration.	3) Ask for intervention of Service Department.
White smoke	1) Oil level too high.	1) Eliminate excess oil.
	2) Motor cold or in prolonged operation with little or no load.	2) Insert load only with motor sufficiently hot
	3) Segments and/or cylinders worn out.	3) Ask for intervention of Service Department.
Too little power provided by motor.	1) Air filter clogged.	1) Clean or replace.
	2) Insufficient fuel distribution, impurities or water in feed circuit.	2) Check the feed circuit, clean and refill once again.
	3) Injectors dirty or defective.	3) Ask for intervention of Service Department.
Low oil pressure	1) Oil level insufficient	1) Reset level. Check for leaks.
	2) Air filter clogged.	2) Replace filter.
	3) Oil pump defective.	3) Ask for intervention of Service Department.
	4) Alarm malfunction.	4) Check the sensor and electrical circuit.
High temperature	1) Overload	1) Check the load connected and diminish.
	2) Insufficient ventilation.	2) Check the cooling vent and relative transmission belts
	3) Insufficient coolant liquid (Only for water cooled motors)	3) Restore level. Check for leaks or breakage in the entire cooling circuit, pipes, couplings, etc.

Problem	Possible cause	Solution
ENGINE		
	4) Water radiator or oil clogged (where it is assembled)	4) Clean cooling fins on radiator
	5) Water circulating pump defective (Only for water cooled motors)	5) Ask for intervention of Service Department
	6) Injectors defective. Injection pump requires calibration	6) Ask for intervention of Service Department
	7) Alarm malfunction	7) Check the sensor and electrical circuit
GENERATOR		
Absence of output voltage	1) Voltage switch in position 0	1) Check position
	2) Voltage switch faulty	2) Check connections and working of the switch, repair or replace
	3) Protection tripped due to overload	3) Check the load connected and diminish
	4) Differential protection device tripped. (Differential switch, differential relay)	4) Check on the entire installation: cables, connections, utilities connected have no defective sheathing which may cause incorrect currents to ground
	5) Protection devices defective	5) Replace
	6) Alternator not sparked	6) Carry out external spark test as indicated in alternator manual. Ask for intervention of Service Department
	7) Alternator defective	7) Check winding, diodes, etc. on alternator (Refer to alternator manual) Repair or replace. Ask for intervention of Service Department
No-load voltage too low or too high	1) Incorrect motor running speed	1) Regulate speed to its nominal no-load value
	2) Voltage regulating device (where it is assembled) defective or requires calibration	2) Adjust regulator device as indicated in alternator manual, or replace
	3) Alternator defective	3) Check winding, diodes, etc. on alternator (Refer to alternator manual) Repair or replace Ask for intervention of Service Department
Corrected no-load voltage too low with load	1) Incorrect motor running speed due to overload	1) Check the load connected and diminish
	2) Load with cos φ less than 0.8	2) Reduce or rephase load
	3) Alternator defective	3) Check winding, diodes, etc. on alternator (Refer to alternator manual) Repair or replace Ask for intervention of Service Department
Unstable tension	1) Contacts malfunctioning	1) Check electrical connections and tighten
	2) Irregular rotation of motor	2) Ask for intervention of Service Department
	3) Alternator defective	3) Check winding, diodes, etc. on alternator (Refer to alternator manual) Repair or replace Ask for intervention of Service Department

WARNING

MOVING PARTS can injure

- Have **qualified** personnel do maintenance and troubleshooting work.
- Stop the engine before doing any work inside the machine. If for any reason the machine must be operated while working inside, **pay attention** moving parts, hot parts (exhaust manifold and muffler, etc.) electrical parts which may be unprotected when the machine is open.
- Remove guards only when necessary to perform maintenance, and replace them when the maintenance requiring their removal is complete.
- Use suitable tools and clothes.
- Do not modify the components if not authorized.

- See pag. M1.1 -

HOT surface can hurt you

NOTE

By maintenance at care of the utilizer we intend all the operatios concerning the verification of mechanical parts, electrical parts and of the fluids subject to use or consumption during the normal operation of the machine.

For what concerns the fluids we must consider as maintenance even the periodical change and or the refills eventually necessary.

Maintenance operations also include machine cleaning operations when carried out on a periodic basis outside of the normal work cycle.

The repairs **cannot be considered** among the maintenance activities, i.e. the replacement of parts subject to occasional damages and the replacement of electric and mechanic components consumed in normal use, by the Assistance Authorized Center as well as by MOSA.

The replacement of tires (for machines equipped with trolleys) must be considered as repair since it is not delivered as standard equipment any lifting system.

The periodic maintenance should be performed according to the schedule shown in the engine manual. An optional hour counter (M) is available to simplify the determination of the working hours.

IMPORTANT

In the maintenance operations avoid that polluting substances, liquids, exhausted oils, etc. bring damage to people or things or can cause negative effects to surroindings, health or safety respecting completely the laws and/ or dispositions in force in the place.

ENGINE and ALTERNATOR

PLEASE REFER TO THE SPECIFIC MANUALS PROVIDED.

VENTILATION
Make certain there are no obstructions (rags, leaves or other) in the air inlet and outlet openings on the machine, alternator and motor.

ELECTRICAL PANELS
Check condition of cables and connections daily.
Clean periodically using a vacuum cleaner, **DO NOT USE COMPRESSED AIR.**

DECALS AND LABELS
*All warning and decals should be checked once a year and **replaced** if missing or unreadable.*

STRENUOUS OPERATING CONDITIONS
Under extreme operating conditions (frequent stops and starts, dusty environment, cold weather,extended periods of no load operation, fuel with over 0.5% sulphur content) do maintenance more frequently.

BATTERY WITHOUT MAINTENANCE
DO NOT OPEN THE BATTERY

The battery is charged automatically from the battery charger circuit suppplied with the engine.

Check the state of the battery from the colour of the warning light which is in the upper part.

- Green colour: battery OK
- Black colour: battery to be recharged
- White colour: battery to be replaced

NOTE

THE ENGINE PROTECTION NOT WORK WHEN THE OIL IS OF LOW QUALITY BECAUSE NOT CHARGED REGULARLY AT INTERVALS AS PRESCRIBED IN THE OWNER'S ENGINE MANUAL.

ATTENTION

- Maintenance operations on the electricity-generating group prearranged for automatic operation must be carried out with the panel in RESET mode.
- Maintenance operations on the installation's electrical panels must be carried out in complete safety by cutting off all external power sources: ELECTRICAL POWER, GROUP and BATTERY.

For the electricity-generating groups prearranged for automatic operation, in addition to carrying out all periodic maintenance operations foreseen for normal usage, various operations must be carried out that are necessary in relation to the specific type of use. The electricity-generating group in fact must be continuously prepared for operation, even after prolonged periods of inactivity.

MAINTENANCE GENERATING SET WITH AUTOMATIC BOARD

	EVERY WEEK	EVERY MONTH AND/OR AFTER INTERVENTION ON LOAD	EVERY YEAR
1. TEST or AUTOMATIC TEST cycle to keep the generating set constantly operative	NO-LOAD X	WITH LOAD X	
2. Check all levels: engine oil, fuel level, battery electrolyte,, if necessary top it up.	X	X	
3. Control of electrical connections and cleaning of control panel		X	X

☞ **Carry out motor oil change at least once a year, even if the requested number of hours has not been attained.**

In case the machine should not be used for more than 30 days, make sure that the room in which it is stored presents a suitable shelter from heat sources, weather changes or anything which can cause rust, corrosion or damages to the machine.

☞ Have **qualified** personnel prepare the machine for storage.

GASOLINE ENGINE

Start the engine: It will run until it stops due to the lack of fuel.

Drain the oil from the engine sump and fill it with new oil (see page M25).

Pour about 10 cc of oil into the spark plug hole and screw the spark plug, after having rotated the crankshaft several times.

Rotate the crankshaft slowly until you feel a certain compression, then leave it.

In case the battery, for the electric start, is assembled, disconnect it.

Clean the covers and all the other parts of the machine carefully.

Protect the machine with a plastic hood and store it in o dry place.

DIESEL ENGINE

For short periods of time it is advisable, about every 10 days, to make the machine work with load for 15-30 minutes, for a correct distribution of the lubricant, to recharge the battery and to prevent any possible bloking of the injection system.

For long periods of inactivity, turn to the after soles service of the engine manufacturer.

Clean the covers and all the other parts of the machine carefully.

Protect the machine with a plastic hood and store it in a dry place.

In case of necessity for first aid and of fire prevention, see page. M2.5.

IMPORTANT

In the storage operations avoid that polluting substances, liquids, exhausted oils, etc. bring damage to people or things or can cause negative effects to surroindings, health or safety respecting completely the laws and/or dispositions in force in the place.

☞ Have **qualified** personnel disassemble the machine and dispose of the parts, including the oil, fuel, etc., in a correct manner when it is to be taken out of service.

As cust off we intend all operations to be made, at utilizer's care, at the end of the use of the machine. This comprises the dismantling of the machine, the subdivision of the several components for a further reutilization or for getting rid of them, the eventual packing and transportation of the eliminated parts up to their delivery to the store, or to the bureau encharged to the cust off or to the storage office, etc.

The several operations concerning the cust off, involve the manipulation of fluids potentially dangerous such as: lubricating oil and battery electrolyte.

The dismantling of metallic parts liable to cause injuries or wounds, must be made wearing heavy gloves and using suitable tools.

The getting rid of the various components of the machine must be made accordingly to rules in force of law a/o local rules.
Particular attention must be paid when getting rid of:
lubricating oils, battery electrolyte, and inflamable liquids such as fuel, cooling liquid.

The machine user is responsible for the observance of the norms concerning the environment conditions with regard to the elimination of the machine being cust off and of all its components.

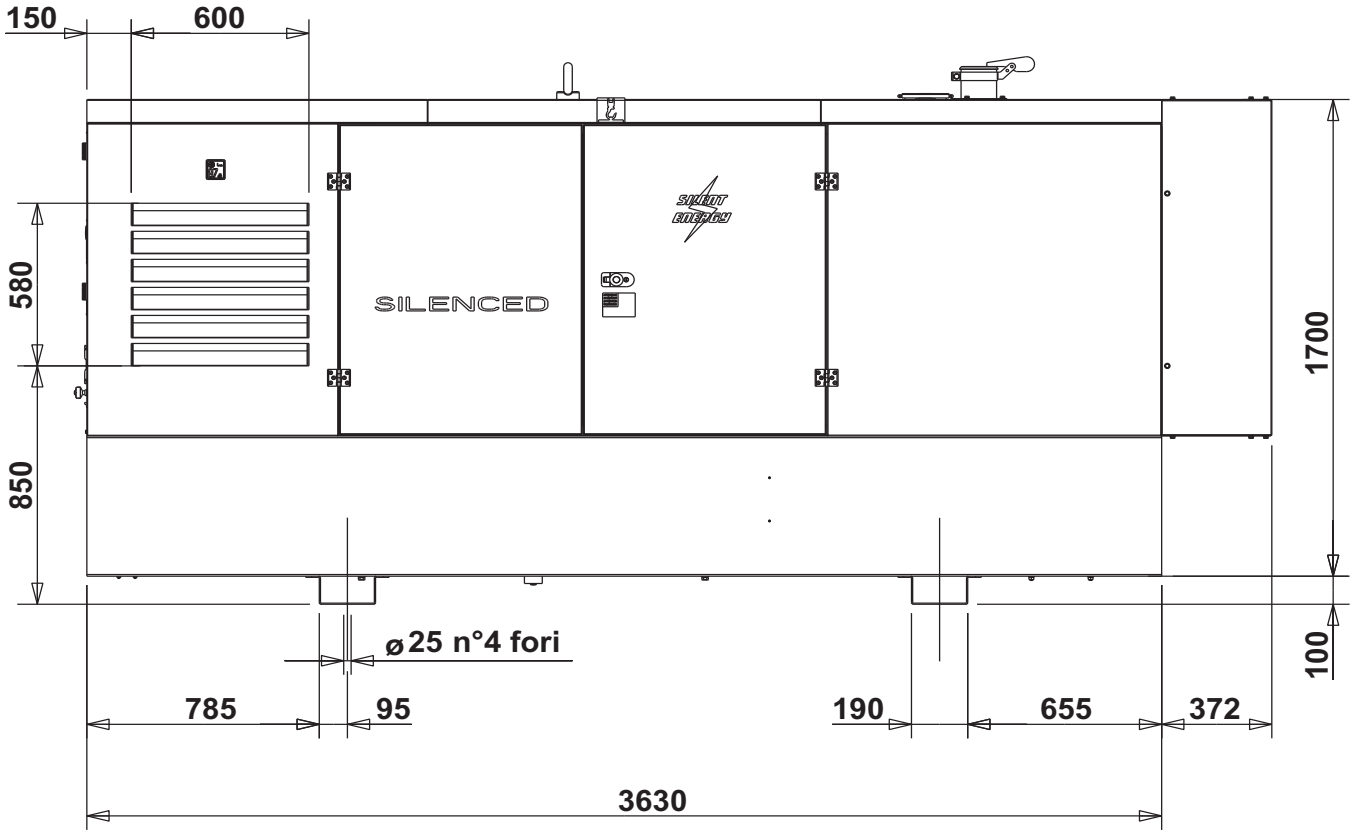
In case the machine should be cust off without any previous disassembly it is however compulsory to remove:
- tank fuel
- engine lubricating oil
- cooling liquid from the engine
- battery

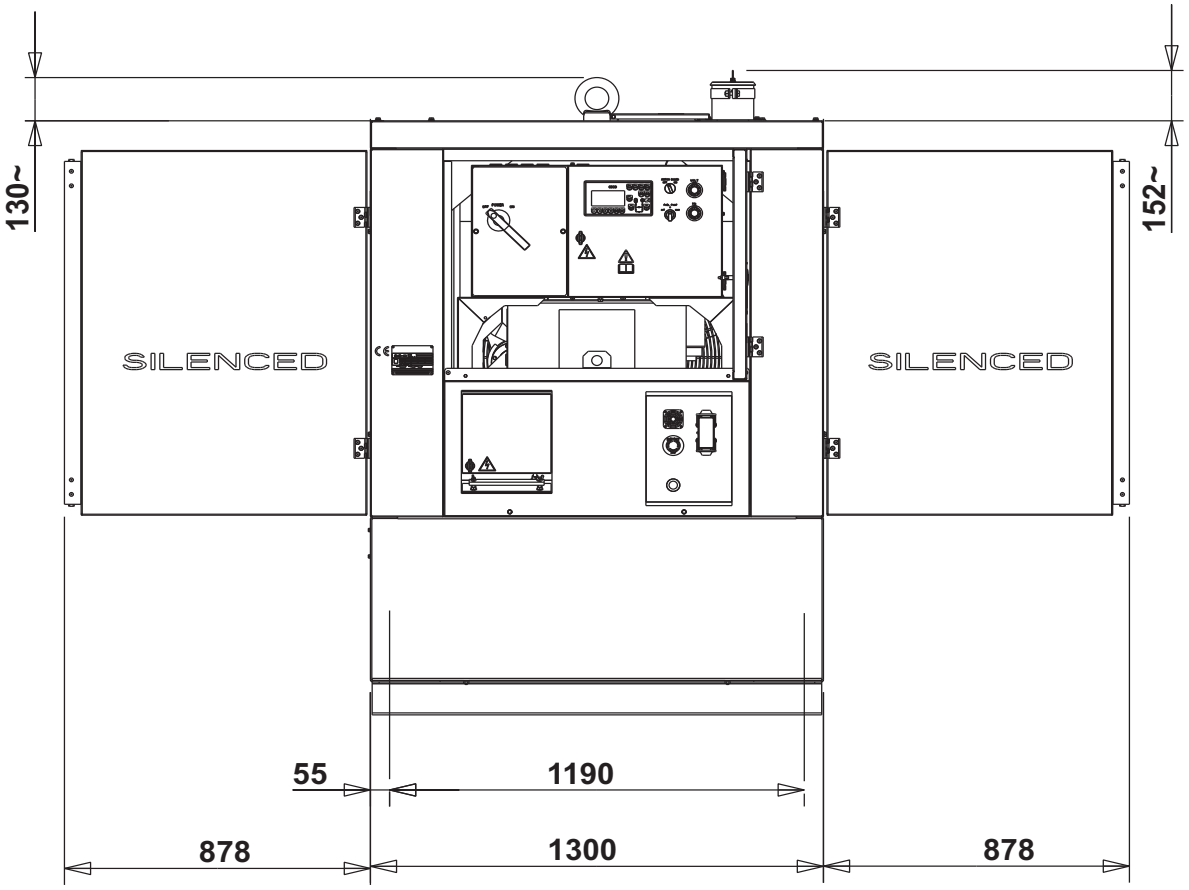
NOTE: MOSA is involved with custing off the machine **only** for the second hand ones, when not reparable.
This, of course, after authorization.

In case of necessity for first aid and fire prevention, see page M2.5.

IMPORTANT

In the cust-off operations avoid that polluting substances, liquids, exhausted oils, etc. bring damage to people or things or can cause negative effects to surroindings, health or safety respecting completely the laws and/or dispositions in force in the place.


150
600
580
850
1700
100
SILENCED
SILENT ENERGY
ø25 n°4 fori
785
95
190
655
372
3630


130~
152~
SILENCED
SILENCED
55
1190
878
1300
878

A: Alternator
B: Wire connection unit
C: Capacitor
D: G.F.I.
E: Welding PCB transformer
F: Fuse
G: 400V 3-phase socket
H: 230V 1phase socket
I: 110V 1-phase socket
L: Socket warning light
M: Hour-counter
N: Voltmeter
P: Welding arc regulator
Q: 230V 3-phase socket
R: Welding control PCB
S: Welding current ammeter
T: Welding current regulator
U: Current transformer
V: Welding voltage voltmeter
Z: Welding sockets
X: Shunt
W: D.C. inductor
Y: Welding diode bridge

A1: Arc striking resistor
B1: Arc striking circuit
C1: 110V D.C./48V D.C. diode bridge
D1: E.P.1 engine protection
E1: Engine stop solenoid
F1: Acceleration solenoid
G1: Fuel level transmitter
H1: Oil or water thermostat
I1: 48V D.C. socket
L1: Oil pressure switch
M1: Fuel warning light
N1: Battery charge warning light
O1: Oil pressure warning light
P1: Fuse
Q1: Starter key
R1: Starter motor
S1: Battery
T1: Battery charge alternator
U1: Battery charge voltage regulator
V1: Solenoid valve control PCBT
Z1: Solenoid valve
W1: Remote control switch
X1: Remote control and/or wire feeder socket
Y1: Remote control plug

A2: Remote control welding regulator
B2: E.P.2 engine protection
C2: Fuel level gauge
D2: Ammeter
E2: Frequency meter
F2: Battery charge trasformer
G2: Battery charge PCB
H2: Voltage selector switch
I2: 48V a.c. socket
L2: Thermal relay
M2: Contactor
N2: G.F.I. and circuit breaker
O2: 42V EEC socket
P2: G.F.I. resistor
Q2: T.E.P. engine protection
R2: Solenoid control PCBT
S2: Oil level transmitter
T2: Engine stop push-button T.C.1
U2: Engine start push-buttonT.C.1
V2: 24V c.a. socket
Z2: Thermal magnetic circuit breaker
W2: S.C.R. protection unit
X2: Remote control socket
Y2: Remote control plug

A3: Insulation moitoring
B3: E.A.S. connector
C3: E.A.S. PCB
D3: Booster socket
E3: Open circuit voltage switch
F3: Stop push-button
G3: Ignition coil
H3: Spark plug
I3: Range switch
L3: Oil shut-down button
M3: Battery charge diode
N3: Relay
O3: Resistor
P3: Sparkler reactor
Q3: Output power unit
R3: Electric siren
S3: E.P.4 engine protection
T3: Engine control PCB
U3: R.P.M. electronic regulator
V3: PTO HI control PCB
Z3: PTO HI 20 l/min push-button
W3: PTO HI 30 l/min push-button
X3: PTO HI reset push-button
Y3: PTO HI 20 l/min indicator

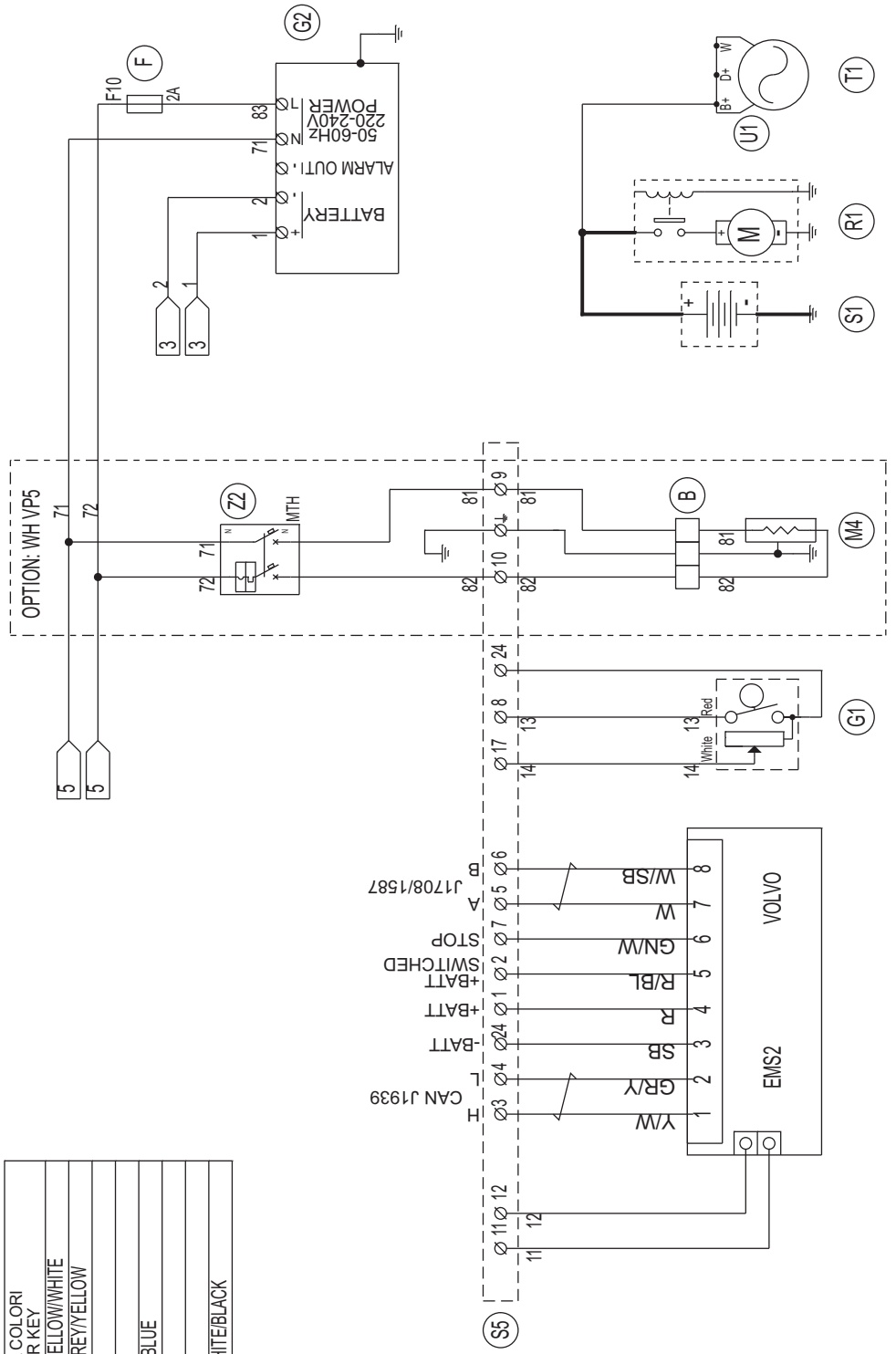
A4: PTO HI 30 l/min indicator
B4: PTO HI reset indicator
C4: PTO HI 20 l/min solenoid valve
D4: PTO HI 30 l/ min solenoid valve
E4: Hydraulic oil pressure switch
F4: Hycraulic oil level gauge
G4: Preheating glow plugs
H4: Preheating gearbox
I4: Preheating indicator
L4: R.C. filter
M4: Heater with thermostat
N4: Choke solenoid
O4: Step relay
P4: Circuit breaker
Q4: Battery charge sockets
R4: Sensor, cooling liquid temperature
S4: Sensor, air filter clogging
T4: Warning light, air filter clogging
U4: Polarity inverter remote control
V4: Polarity inverter switch
Z4: Transformer 230/48V
W4: Diode bridge, polarity change
X4: Base current diode bridge
Y4: PCB control unit, polarity inverter

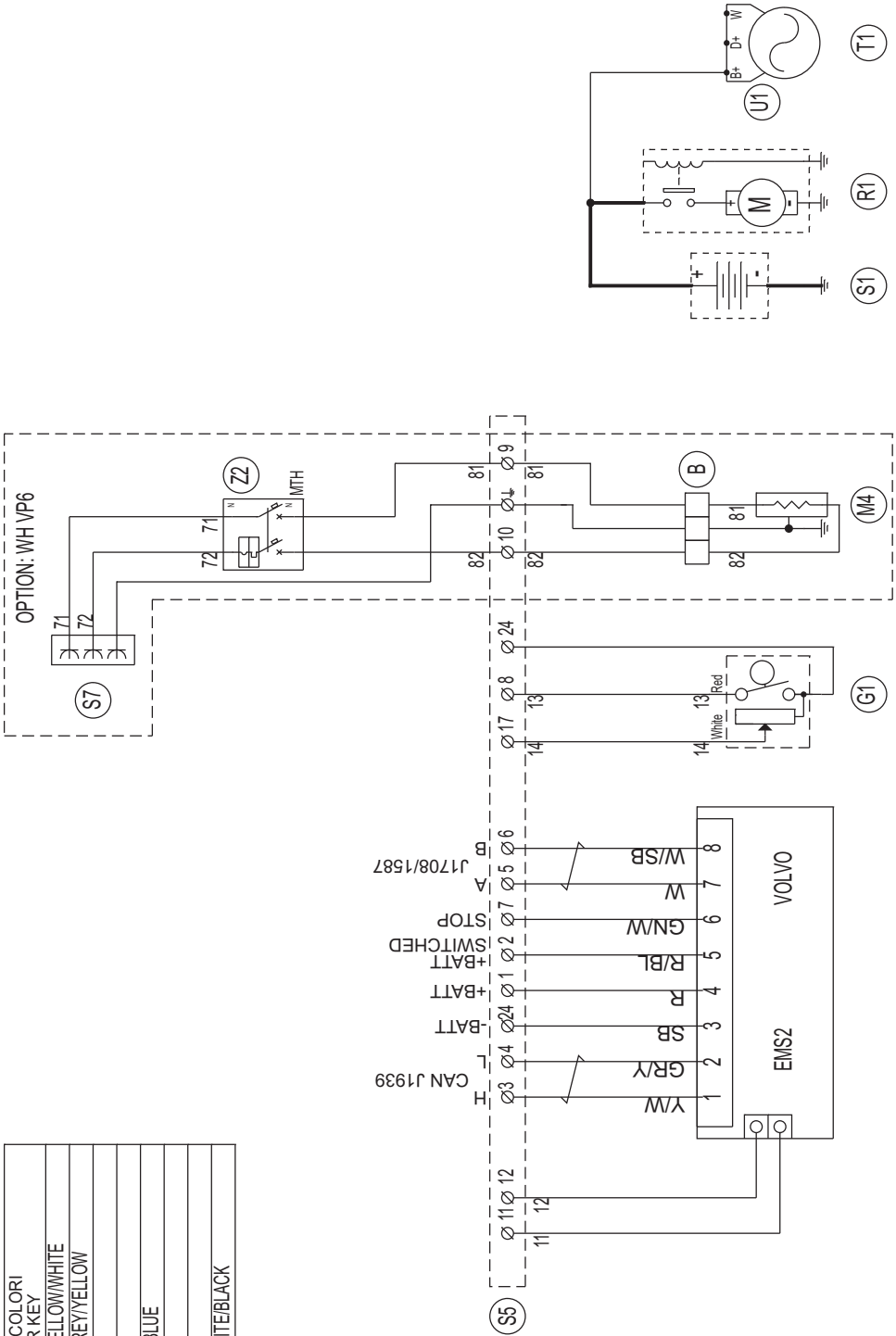
A5: Base current switch
B5: Auxiliary push-button ON/OFF
C5: Accelerator electronic control
D5: Actuator
E5: Pick-up
F5: Warning light, high temperature
G5: Commutator auxiliary power
H5: 24V diode bridge
I5: Y/s commutator
L5: Emergency stop button
M5: Engine protection EP5
N5: Pre-heat push-button
O5: Accelerator solenoid PCB
P5: Oil pressure switch
Q5: Water temperature switch
R5: Water heater
S5: Engine connector 24 poles
T5: Electronic GFI relais
U5: Release coil, circuit breaker
V5: Oil pressure indicator
Z5: Water temperature indicator
W5: Battery voltmeter
X5: Contactor, polarity change
Y5: Commutator/switch, series/parallel

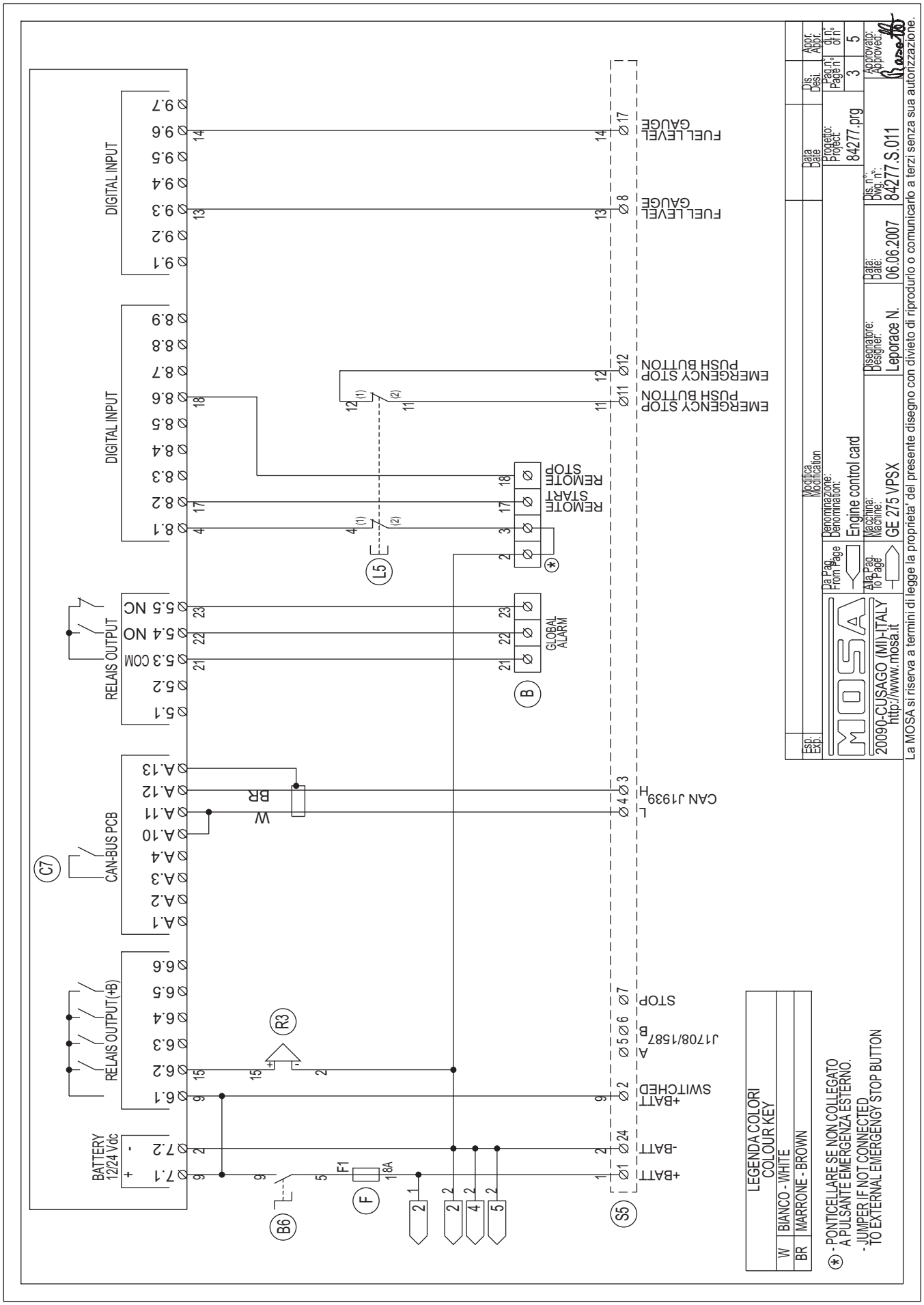
A6: Commutator/switch
B6: Key switch, on/off
C6: QEA control unit
D6: Connector, PAC
E6: Frequency rpm regulator
F6: Arc-Force selector
G6: Device starting motor
H6: Fuel electro pump 12V c.c.
I6: Start Local/Remote selector
L6: Choke button
M6: Switch CC/CV
N6: Connector – wire feeder
O6: 420V/110V 3-phase transformer
P6: Switch IDLE/RUN
Q6: Hz/V/A analogic instrument
R6: EMC filter
S6: Wire feeder supply switch
T6: Wire feeder socket
U6: DSP chopper PCB
V6: Power chopper supply PCB
Z6: Switch and leds PCB
W6: Hall sensor
X6: Water heather indicator
Y6: Battery charge indicator

A7: Transfer pump selector AUT-0-MAN
B7: Fuel transfer pump
C7: „GECO“ generating set test
D7: Flooting with level switches
E7: Voltmeter regulator
F7: WELD/AUX switch
G7: Reactor, 3-phase
H7: Switch disconnector
I7: Solenoid stop timer
L7: "VODIA" connector
M7: "F" EDC4 connector
N7: OFF-ON-DIAGN. selector
O7: DIAGNOSTIC push-button
P7: DIAGNOSTIC indicator
Q7: Welding selector mode
R7: VRD load
S7: 230V 1-phase plug
T7: V/Hz analogic instrument
U7: Engine protection EP6
V7: G.F.I. relay supply switch
Z7: Radio remote control receiver
W7: Radio remote control trasnsmitter
X7: Isometer test push-button
Y7: Remote start socket

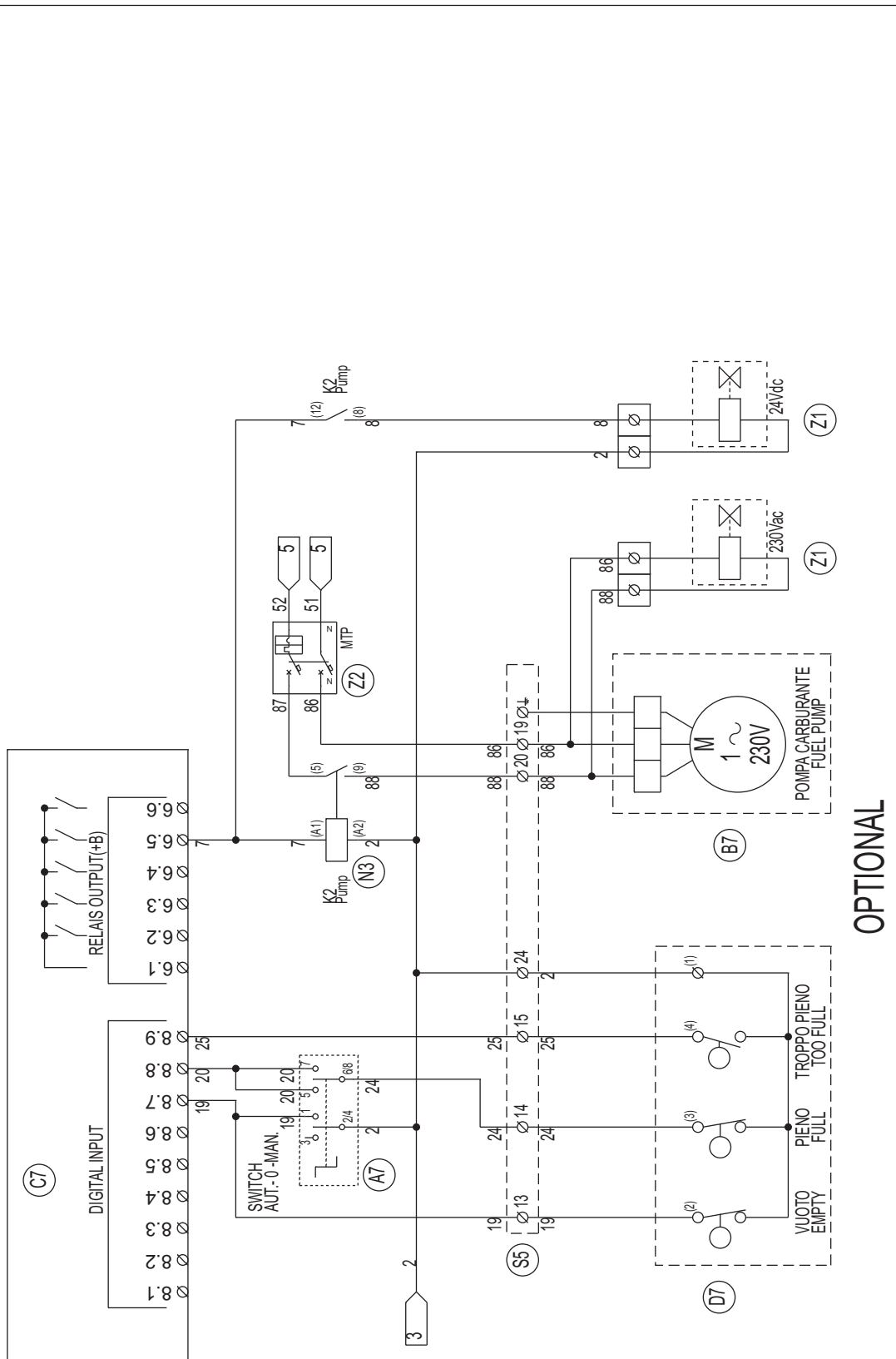
A8: Transfer fuel pump control
B8: Ammeter selector switch
C8: 400V/230V/115V commutator
D8: 50/60 Hz switch
E8: Cold start advance with temp. switch
F8: START/STOP switch
G8: Polarity inverter two way switch
H8: Engine protection EP7
I8: AUTOIDLE switch
L8: AUTOIDLE PCB
M8: A4E2 ECM engine PCB
N8: Remote emergency stop connector
O8: V/A digital instruments and led VRD PCB
P8: Water in fuel
Q8:
R8:
S8:
T8:
U8:
V8:
Z8:
W8:
X8:
Y8:


LEGENDA COLORI
COLOUR KEY
Y/W GIALLO/BIANCO - YELLOW/WHITE
GR/Y GRIGIO/GIALLO - GREY/YELLOW
SB NERO - BLACK
R ROSSO - RED
R/BL ROSSO/BLU - RED/BLUE
GN/W VERDE - GREEN
W BIANCO - WHITE
W/SB BIANCO/NERO - WHITE/BLACK
OPTION: WH VP5
F10
2A
BATTERY
ALARM OUT
50-60HZ
220-240V
POWER
IMTH
Red
White
J1708/1587
CAN J1939
-BATT
+BATT
+BATT
SWITCHED
STOP
VOLVO
EMS2
Engine Volvo Penta TAD734GE
GE 275 VPSX
Leporace N.
06.06.2007
84277.S.010
84277.prg
20090-CUSAGO (MI)-ITALY
http://www.mosa.it
La MOSA si riserva a termini di legge la proprieta' del presente disegno con divieto di riprodurlo o comunicarlo a terzi senza sua autorizzazione.

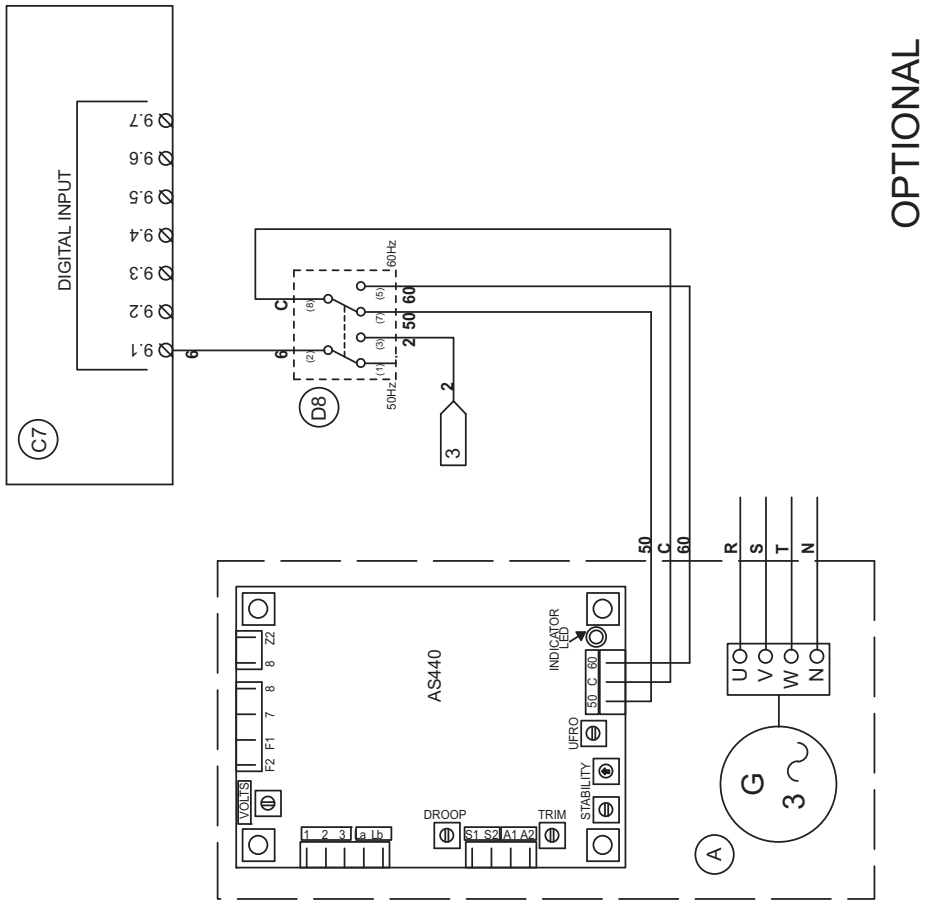




25/05/07 84277-I



Esp. Exp.
Modifica Modification
Data Date
Dis. Desi.
Appr. Appr.
Da Pag. From Page
Denominazione: Denomination: Transfer fuel pump kit
Progetto: Project: 84277.prg
Pag n° Page n° 4
di n° 5
Alla Pag. To Page
Macchina: Machine: GE 275 VPSX
Disegnatore: Designer: Leporace N.
Data: Date: 07.06.2007
Dis. n°: Dwg. n°: 84277.S.015
Approvato: Approved:
MOSA
20090-CUSAGO (MI)-ITALY
http://www.mosa.it



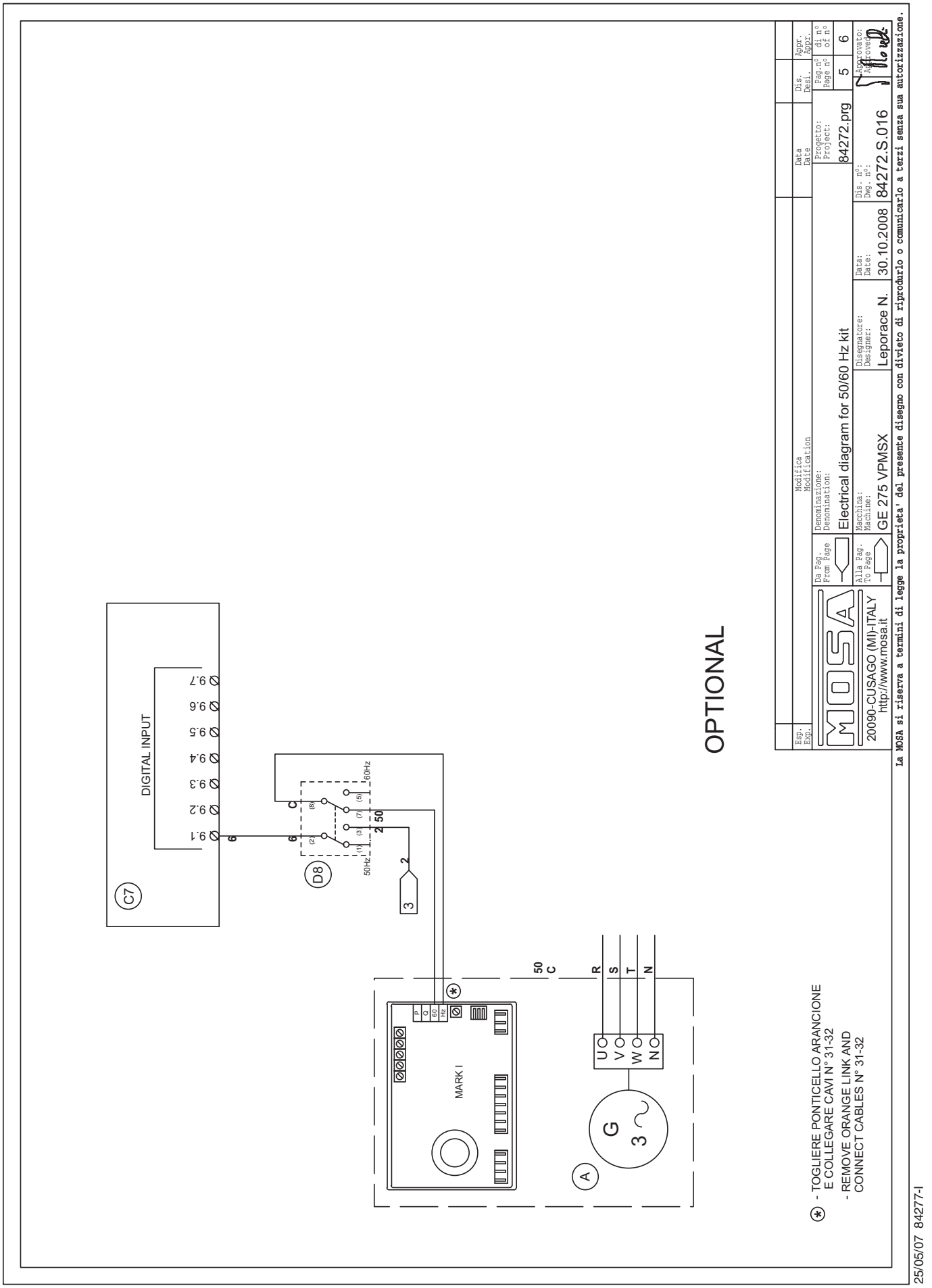
Modifica / Modification

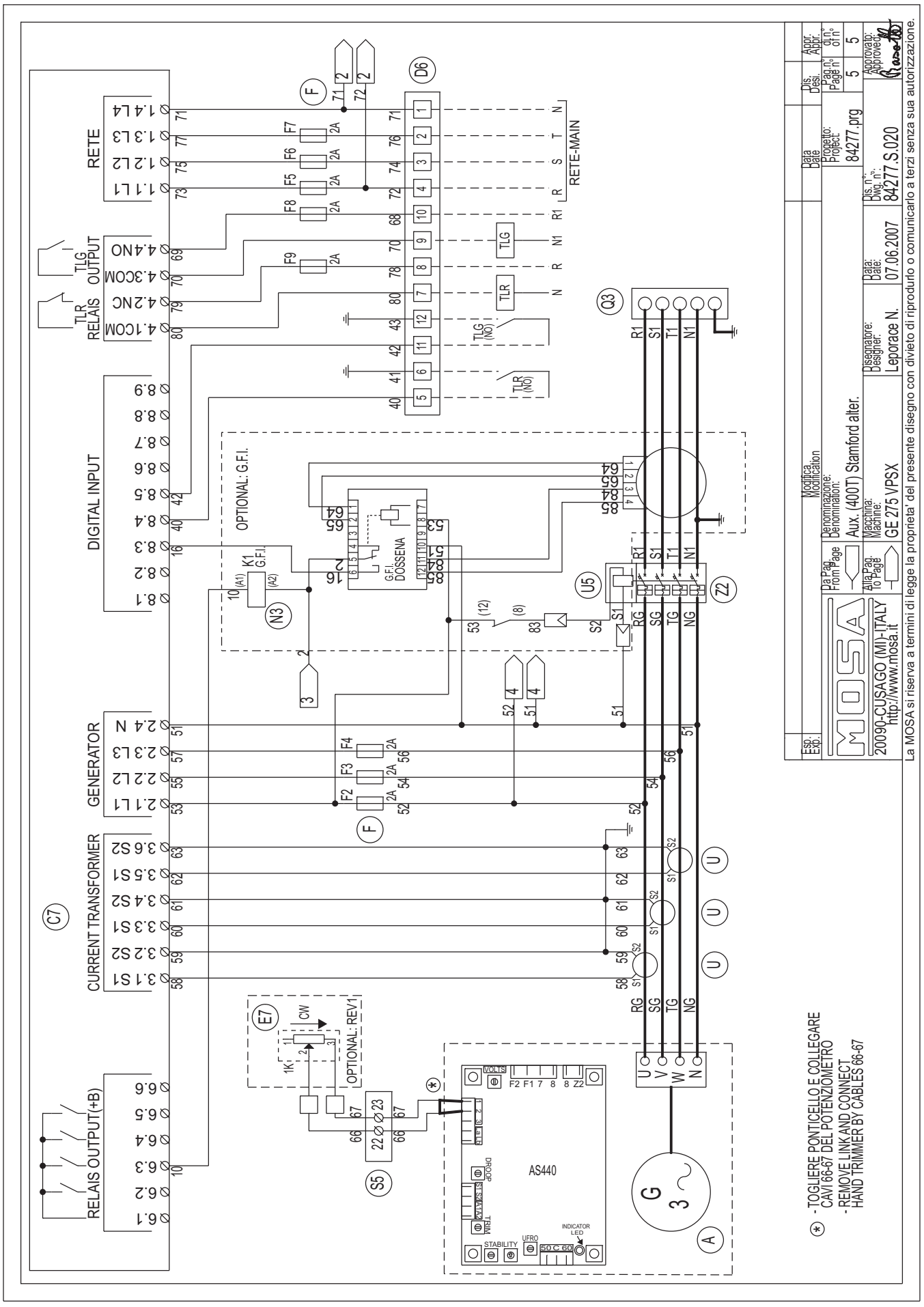
Bsp. / Exp.

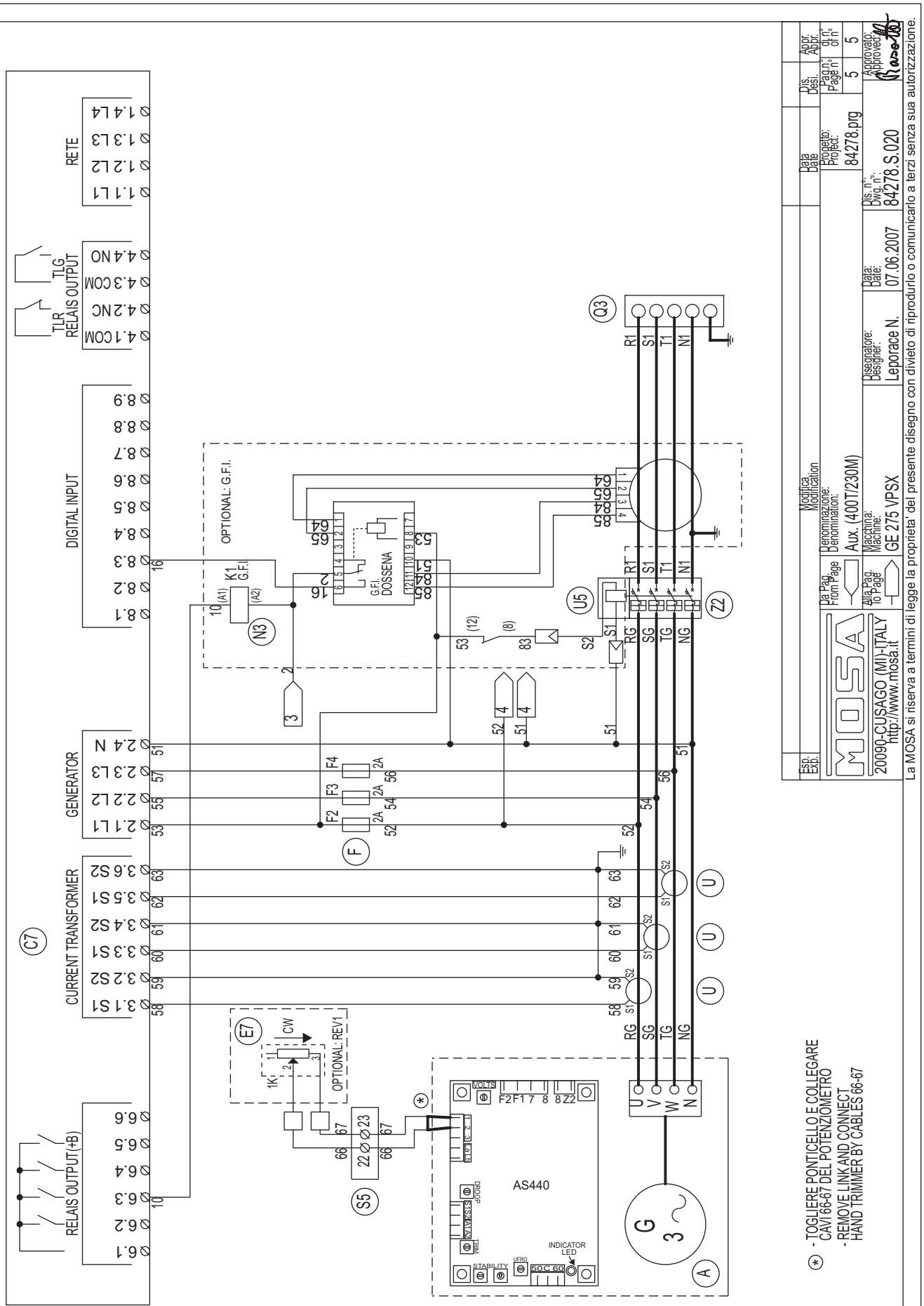
MOSA
20090-CUSAGO (MI)-ITALY
http://www.mosa.it

Da Pag. / From Page
Alla Pag. / To Page

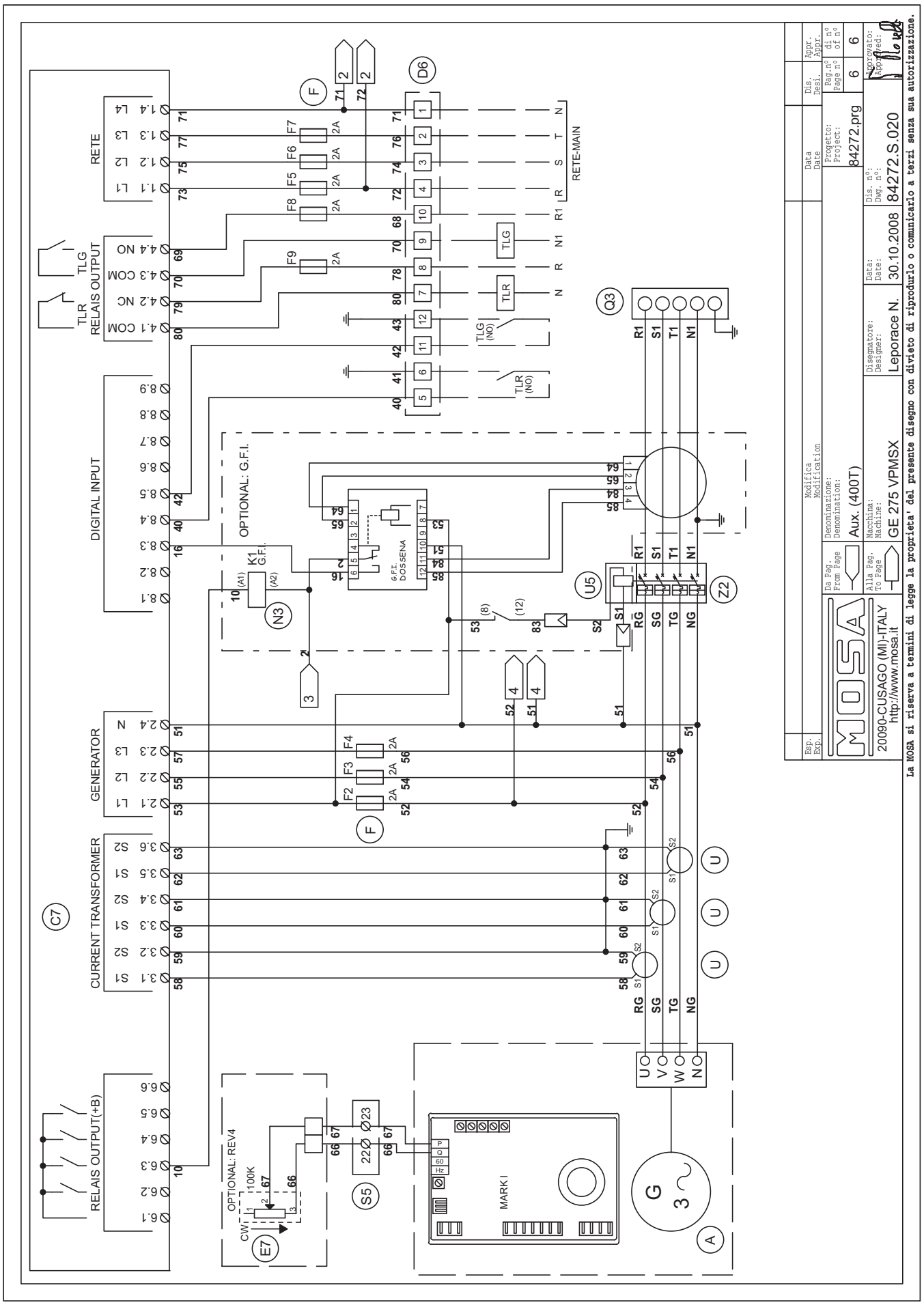
Denominazione: / Denomination: Electrical diagram for 50/60 Hz kit
Macchina: / Machine: GE 275 VPSX
Disegnatore: / Designer: Leporace N.
Data: / Date: 15.06.2007
Progetto: / Project: 84278.prg
Dis. n°: / Dwg. n°: 84278.S.016
Pag n° / Page n°: 5
di n° / of n°: 6
Data / Date
Dis. / Desi.
Appr. / Appr.
Approvato: / Approved:



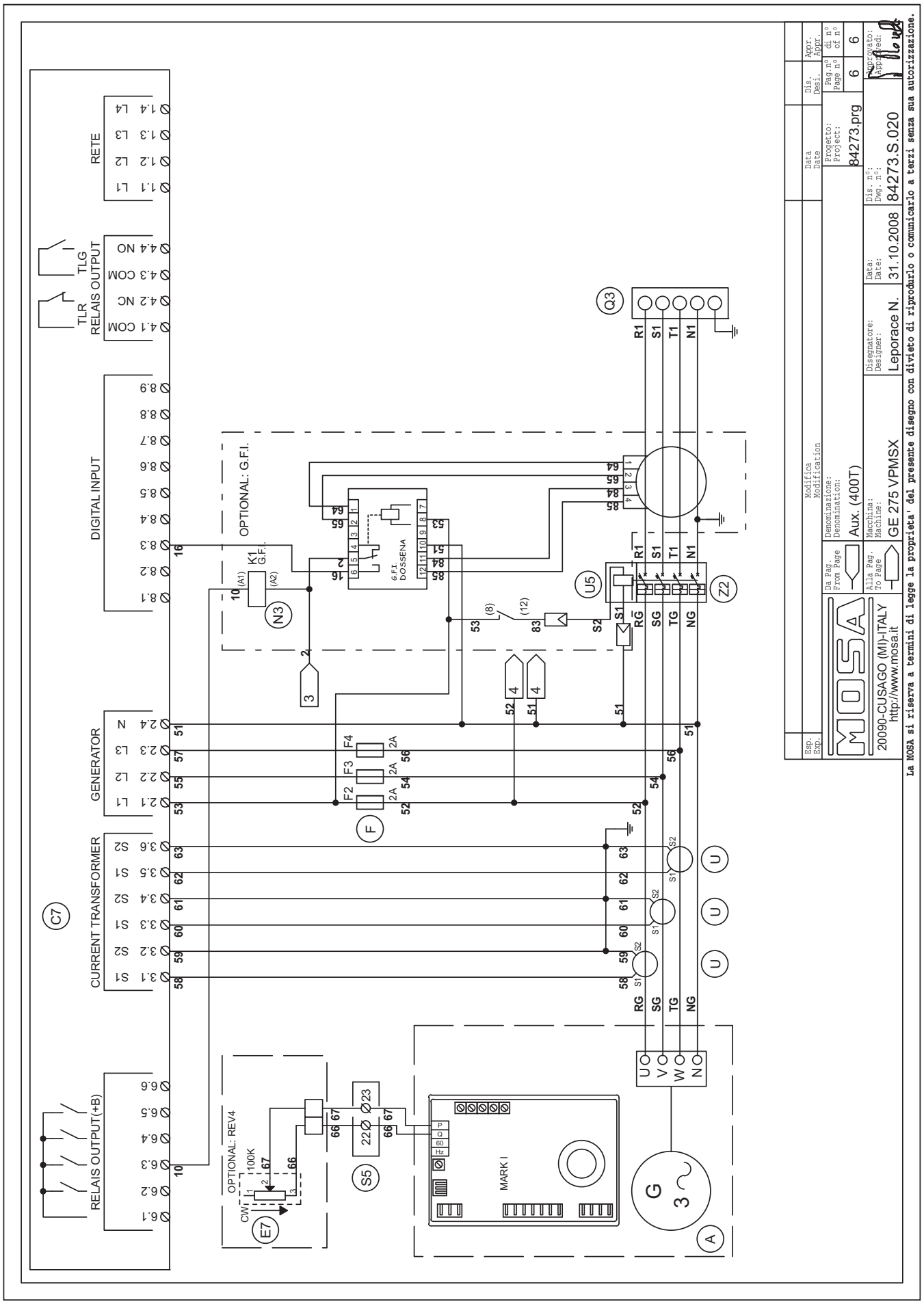




25/05/07 84277-I



25/05/07 84277-I



25/05/07 84277-I

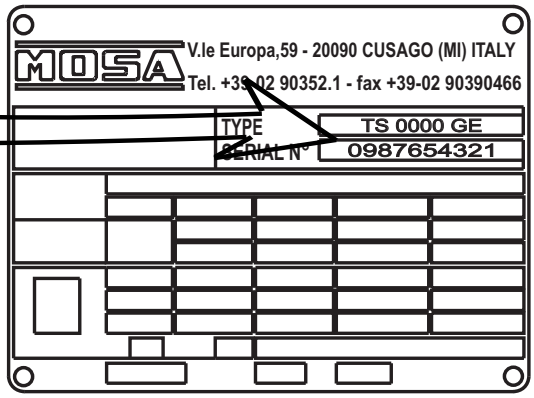
MOSA guarantees that any request for spare parts will be satisfied.

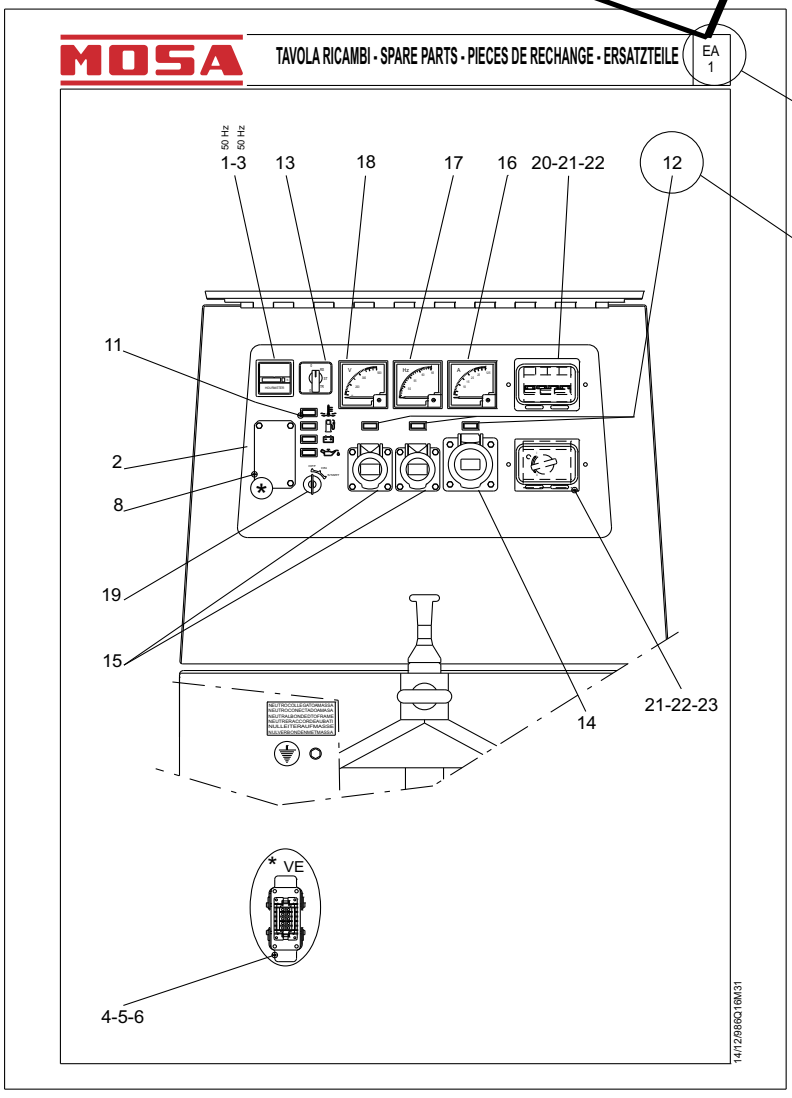
To keep the machine in full working order, when replacement of MOSA spare parts is required, always ask for genuine parts only.

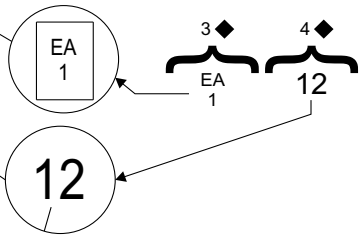
☞ The requested data are to be found on the data plate located on the machine structure, quite visible and easy to consult. ✹

When ordering the spare parts, it is recommended to indicate:

1) ✹ serial number
2) ✹ model of welder and/or generating set
3) ◆ n. table
4) ◆ n. position
5) quantity

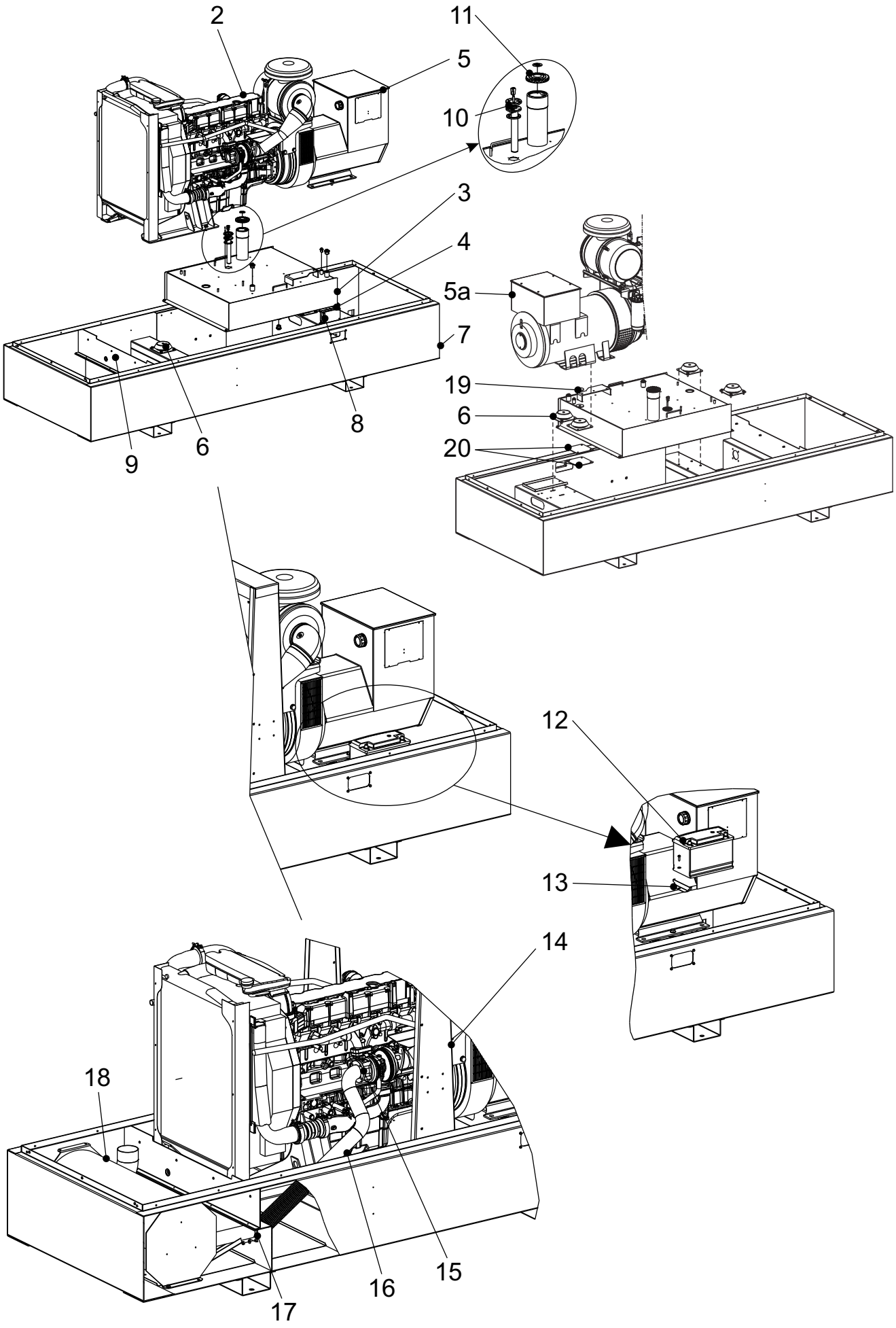






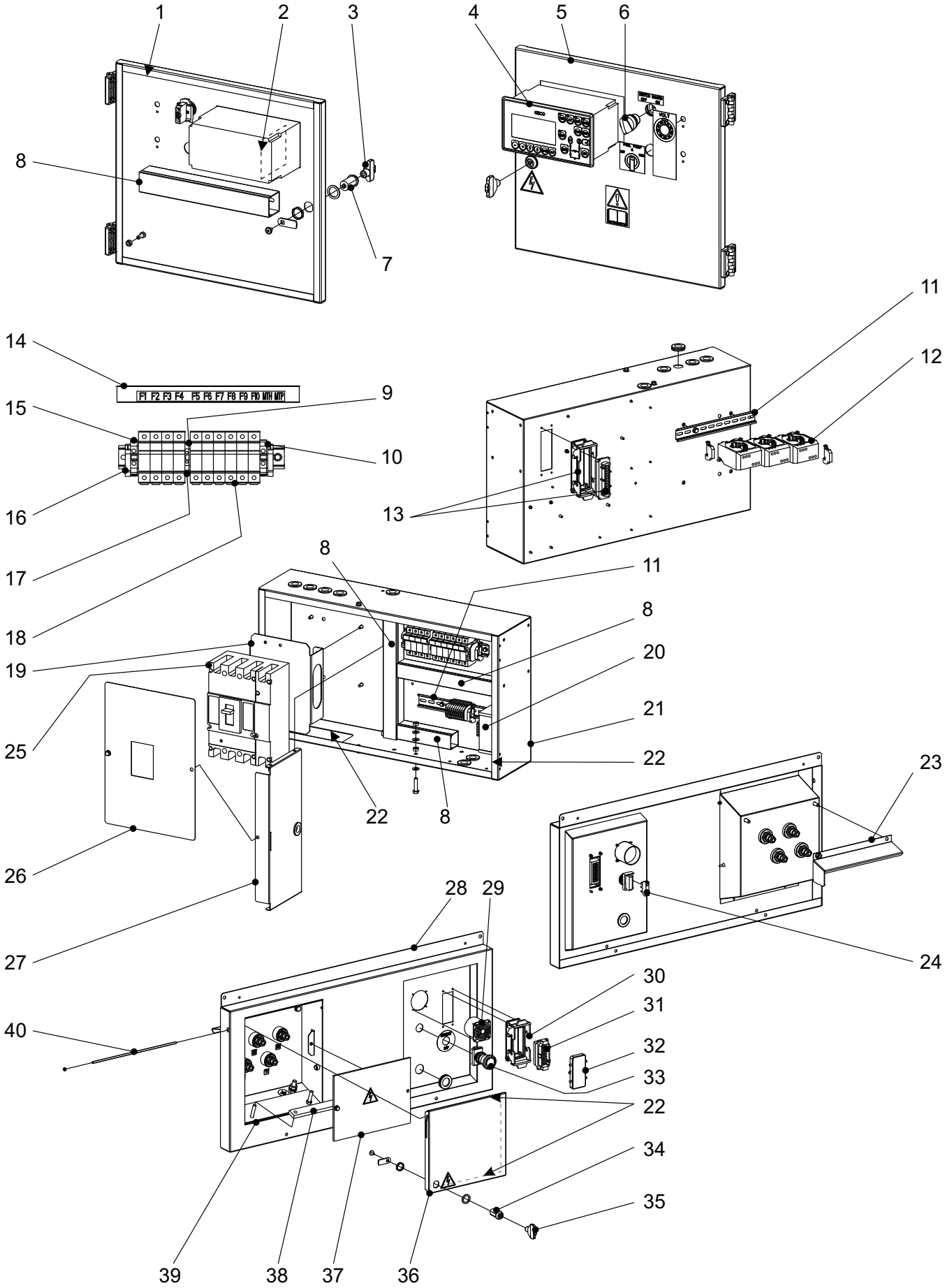
ABBREVIATIONS AND SYMBOLS:

(EV) When ordering, specify the engine type and the auxiliary voltage
(ER) Engine with recoil starter only
(ES) Engine with electric starter only
(VE) E.A.S version only.
(QM) When ordering, specify the length in meters
(VS) Special version only
(SR) By request only

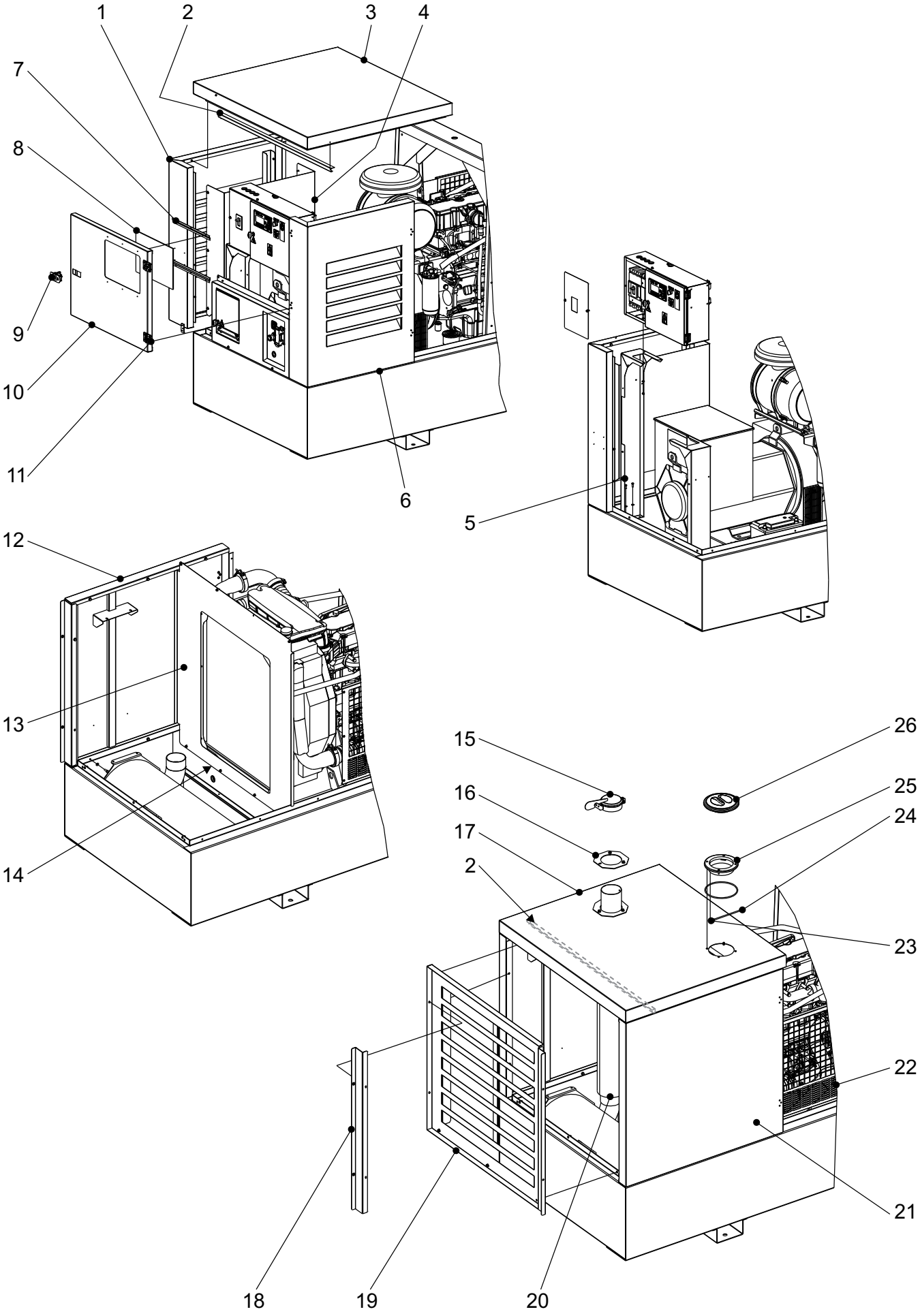

2
11
5
10
3
4
5a
7
19
6
20
8
9
6
12
13
14
18
15
16
17

Pos.	Rev. Cod.	Descr.	Note
2	842762200	MOTORE VOLVO PENTA	
3	842252020	SERBATOIO CARBURANTE	
4	842251242	CORNICE FISS.PANNELLO IN GOMMA	
5	842753100	ALT. STAMFORD	
5a	842753100	ALT. MARELLI	Da REV.1-02/09 Del.183/08 24/10/08
6	842251035	ANTIVIBRANTE A CAMPANA	
7	842231050	BASAMENTO	
8	842252134	PANNELLO GOMMA USC.TUBI SERBAT	
9	842778152	LISTELLO CHIUSURA INFERIORE RADIATORE	
10	764409975	SENSORE LIVELLO CARBURANTE(L=225)	
11	842252026	TAPPO SERB. CARBUR. BAIONETTA D80	
12	764409150	BATTERIA	
13	842759154	STAFFA FISSAGGIO BATTERIA	
14	842251100	ROLL BAR	
15	842772069	GUARNIZIONE	
16	842772070	TUBO SCARICO	
17	841452069	GUARNIZIONE SCARICO MOTORE	
18	842252050	SILENZIATORE DI SCARICO	
19	841252032	RONDELLA	Da REV.1-02/09 Del.183/08 24/10/08 Versione con Alt. Marelli
20	842252032	PIASTRA SPESSORE ALTERNATORE	Da REV.1-02/09 Del.183/08 24/10/08 Versione con Alt. Marelli

Pos.	Rev. Cod.	Descr.	Note
2	842762200	VOLVO PENTA ENGINE	
3	842252020	FUEL TANK	
4	842251242	RUBBER FIXING FRAME	
5	842753100	STAMFORD ALTERNATOR	
5a	842753100	MARELLI ALTERNATOR	From REV.1-02/09 Del.183/08 24/10/08
6	842251035	VIBRATION DAMPER	
7	842231050	BASE	
8	842252134	RUBBER PROTECTION FOR OUTLET PIPES	
9	842778152	LOCKING LISTEL FOR RADIATOR BUTTOM	
10	764409975	FUEL LEVEL SENSOR	
11	842252026	FUEL TANK, CAP	
12	764409150	BATTERY	
13	842759154	BATTERY SUPPORT BRACKET	
14	842251100	ROLL BAR	
15	842772069	GASKET	
16	842772070	EXHAUST PIPE	
17	841452069	GASKET	
18	842252050	MUFFLER EXHAUST	
19	841252032	WASHER	From REV.1-02/09 Del.183/08 24/10/08 Version with Alt. Marelli
20	842252032	PLATE ALTERNATOR (SPACER)	From REV.1-02/09 Del.183/08 24/10/08 Version with Alt. Marelli

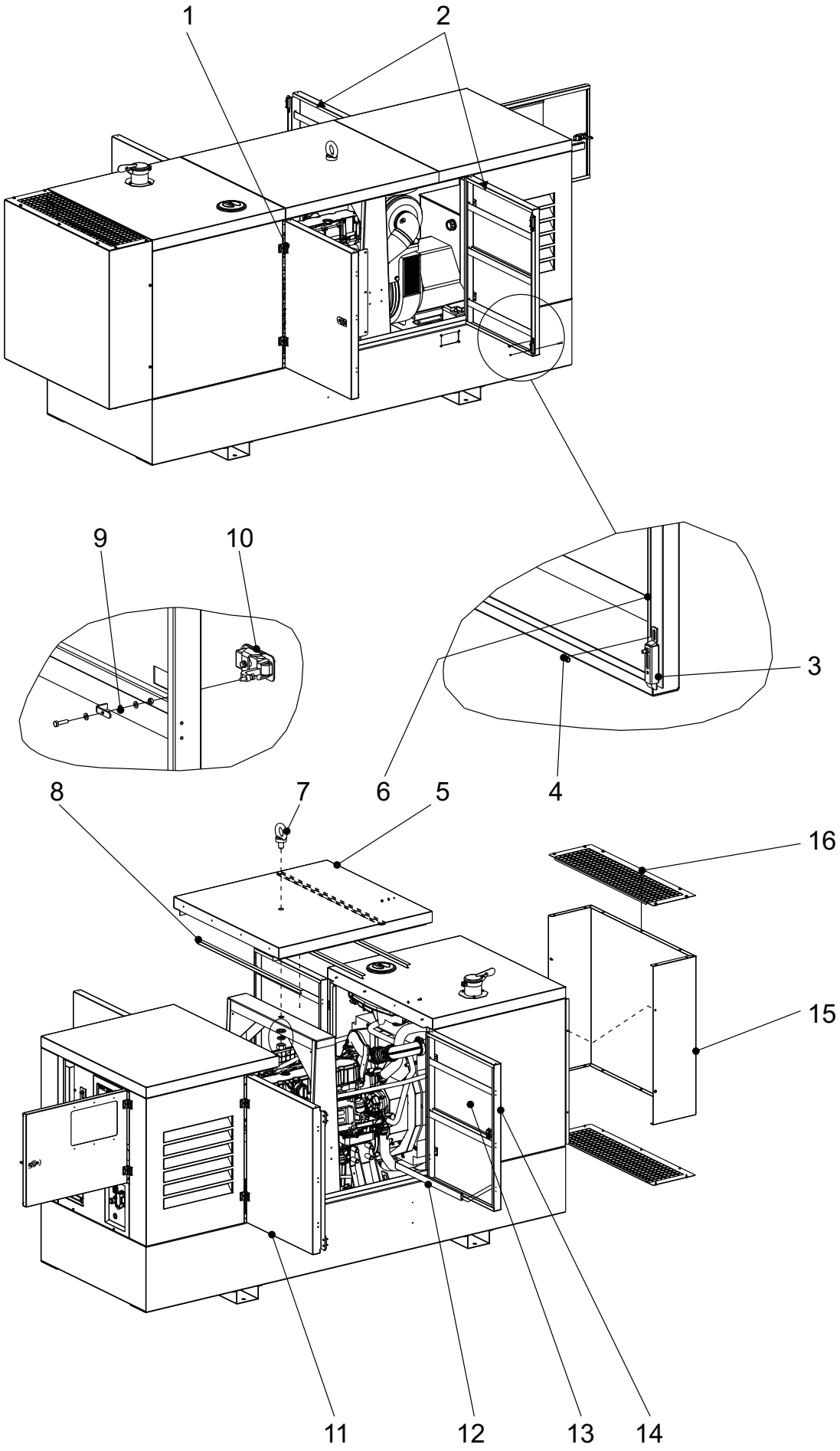

1
2
3
4
5
6
8
7
11
14
12
F1 F2 F3 F4 F5 F6 F7 F8 F9 F10 MIN MIP
9
15
10
16
13
17
18
8
11
19
8
20
25
21
22
22
8
23
26
24
28
29
27
30
40
31
32
33
22
34
35
39
38
37
36

Pos.	Rev.	Cod.	Descr.	Note
1		309509005	GUARNIZIONE / *GASKET*	
2		842779553	SCHEDA CANBUS / *PCB CANBUS*	
3		744507057	CHIAVE SERRATURA QUADRO ELETT. / *ELECTRICAL BOARD KEY*	
4		842259550	CONTROLLO GRUPPO ELETTROGENO / *GENERATOR CONTROL "GECO"*	
5		842257020	PANNELLO FRONTALE / *FRONT PANEL*	
6		842777236	SELETTORE A 2 POSIZIONI / *TWO-WAY SWITCH*	
7		744508112	SERRATURA PER COPERCHIO FRONT. / *FRONT COVER LOCK*	
8		1244020	CANALINA PER CAVI / *CABLE CHANNEL*	
9		1242050	TERMINALE MORSETTIERA / *TERMINAL BOARD*	
10		1242060	TERMINALE MORSETTIERA / *TERMINAL BOARD*	
11		1243020	GUIDA PER MORSETTIERA / *TERMINAL GUIDE*	
12		842257306	TRASFORMATORE AMPEROM. / *TRANSFORMER*	
13		84278C022	CONNETTORE COMPLETO / *CONNECTOR COMPLETE*	
14		1244010	CANALINA PER CAVI / *CABLE CHANNEL*	
15		1240040	MORSETTIERA / *TERMINAL BOARD*	
16		1241010	PIASTRINA / *PLATE*	
17		1240020	MORSETTO 4mmq /*TERMINAL 4mmq*	
18		107509045	PORTAFUSIBILE / *HOLDER, FUSE*	
19		842257036	STAFFA SUPP.INTERR.MAGNETOTER. / *BRACKET MAGNETO SWITCH*	
20		842259830	UNITA'CARICA BATTERIA 2.5A / 24V/*UNIT CHARGE BATTERY*	
21		842257010	SCATOLA ELETTRICA / *ELECTRIC BOX*	
22		306418310	GUARNIZIONE (L=MT.1) / *PROTECTION GASKET (L=MT.1)*	
23		842257324	PROTEZIONE CASSETTA ALIMENTAZ. / *SUPPLY BOX PROTECTION*	
24		744507237	CONTATTO NC AGGIUNTIVOPER PULSANTE / *SUPPLEMENTARY CONTACT FOR PUSH-KNOB*	
25		842257325	INT.MAGNETOTERM.(SCAT) 4P 400A / *CIRCUIT BREAKER*	
26		842257015	COPERCHIO SCATOLA ELETTRICA / *ELECTRIC BOX COVER*	
27		842257061	SEPARATORE SCATOLA ELETTRICA / *ELECTRIC BOX SEPARATOR*	
28		842258005	CARENATURA ANTERIORE / *COVER FRONT*	
29		315507215	AVVISATORE ACUSTICO / *ACOUSTIC ALARM SYSTEM*	
30		842257170	CUSTODIA FISSA CONNETTORE 16C. / *CONNECTOR HOUSING*	
31		842257173	FRUTTO SPINA CONNETTORE 16C / *CONNECTOR PLUG*	
32		842257174	COPERCHIETTO DI CHIUSURA 16C. / *BLIND PLATE*	
33		744507219	PULSANTE STOP D'EMERGENZA / *EMERGENCY PUSH BUTTON STOP*	
34		744508112	SERRATURA PER COPERCHIO FRONT. / *FRONT COVER LOCK*	
35		744507057	CHIAVE SERRATURA QUADRO ELETT. / *ELECTRICAL BOARD KEY*	
36		842257313	COPERCHIO CHIUS.CASS.ALIMENT. / *SUPPLY BOX COVER*	
37		842258161	SCHERMO PROTETTIVO / *PROTECTIVE FRAME*	
38		842258264	PIASTRINA ISOLANTE FERMA CAVI / *RUBBER WIRE PROTECTION*	
39		842259505	PANNELLO GOMMA PROTEZIONE CAVI / *RUBBER WIRE PROTECTION*	
40		842258073	TIRANTE / *TIE-ROD*	


1
2
3
4
7
8
9
10
11
6
5
12
13
14
15
26
16
25
17
24
2
23
22
21
18
19
20

Pos.	Rev.	Cod.	Descr.	Note
1		842258004	FIANCATA CARENATURA SX	
2		842258464	STAFFA FERMO FONOASSORBENTE	
3		842258170	CAREN.SUP.LATO ALTERNATORE	
4		842258095	CASSONETTO ASPIRAZIONE ARIA	
5		842757102	SUPP.SCATOLA APPARECCH.ELETTR.	
6		842258003	FIANCATA CARENATURA DX	
7		744508090	SQUADR.FISS.SCHERMO PORTELLA	
8		744508089	SCHERMO PER PORTELLA	
9		744508136	MANIGLIA A PULSANTE	
10		842258426	FIANCATA LATO STRUMENTI	
11		744508140	CERNIERA PER FIANCATA	
12		842758020	FIANCATA POSTERIORE DX	
13		842778215	PARETE SCARICO ARIA MOTORE	
14		105112270	GUARNIZIONE (L=MT.1)	
15		842252053	COPERCHIETTO PARAPIOGGIA D120	
16		842252068	FLANGIA PER TUBO SCARICO	
17		842778175	CAREN.SUP.LATO ALTERNATORE	
18		842258293	PIASTRA FISS. CASSONETTO ESP.	
19		842258065	GRIGLIA USCITA ARIA	
20		842752078	RACCORDO TUBO SCARICO	
21		842758025	FIANCATA POSTERIORE SX	
22		842772058	PROTEZIONE TERMICA	
23		841659358	ANELLO DOPPIO	
24		841659357	TIRANTE IN GOMMA	
25		841658361	GHIERA PER COPERCHIO ERMETICO	
26		841658360	COPERCHIO ERMETICO	

Pos.	Rev.	Cod.	Descr.	Note
1		842258004	LEFT COVER	
2		842258464	SOUND-PROOF MATERIAL BRACKET	
3		842258170	TOP COVER, ALTERNATOR SIDE	
4		842258095	BOX AIR INLET	
5		842757102	SUPPORT, ELECTRICAL EQUIPMENT	
6		842258003	COVER RIGHT SIDE	
7		744508090	FIXING BRACKET DOOR SCREEN	
8		744508089	GLASS COVER	
9		744508136	HANDLE	
10		842258426	COVER COMMANDS SIDE	
11		744508140	LATCH	
12		842758020	REAR RIGHT COVER	
13		842778215	ENGINE AIR EXHAUST SITE	
14		105112270	STRIP, SEALING (L=MT.1)	
15		842252053	WATER CAP	
16		842252068	EXHAUST PIPE FLANGE	
17		842778175	TOP COVER, ALTERNATOR SIDE	
18		842258293	FIXING PLATE FOR INTAKE COVER	
19		842258065	AIR OUTLET GRILL	
20		842752078	PIPE FITTING, EXHAUST PIPE	
21		842758025	REAR LEFT COVER	
22		842772058	THERMOPROTECTION	
23		841659358	DOUBLE RING	
24		841659357	TIE ROD	
25		841658361	FLANGE FOR AIR-TIGHT SEALED COVER	
26		841658360	ERMETIC COVER	



Pos.	Rev.	Cod.	Descr.
1		744508140	CERNIERA PER FIANCATA
2		309509005	GUARNIZIONE
3		842258163	CHIUSURA A CRICCHETTO
4		105111450	MORSETTO
5		842758030	FASCIA CENTRALE CAREN. SUP.
6		842258460	FILO ARMONICO
7		6033050	GOLFARE
8		842258464	STAFFA FERMO FONOASSORBENTE
9		842258137	SCARPETTA PER CHIUSURA
10		744508136	MANIGLIA A PULSANTE
11		842258458	FIANCATA INTERMEDIA
12		842258444	LISTELLO FERMO FONOASSORBENTE
13		842258501	FONOASSORBENTE PER PORTIERA
14		842258428	FIANCATA INTERMEDIA
15		842258200	CASSONETTO
16		842258067	FONDO CASSONETTO ESP. ARIA

Pos.	Rev.	Cod.	Descr.
1		744508140	LATCH
2		309509005	GASKET
3		842258163	JACK-GEAR LOCK
4		105111450	TERMINAL
5		842758030	TOP COVER MIDDLE FRAME
6		842258460	HARMONIC WIRE
7		6033050	UP-EAVING RING
8		842258464	SOUND-PROOF MATERIAL BRACKET
9		842258137	CLOCK LATCH
10		744508136	HANDLE
11		842258458	MIDDLE COVER
12		842258444	STOP LISTEL FOR SOUND-PROOF MATERIAL
13		842258501	SOUND-PROOF MATERIAL FOR DOOR
14		842258428	MIDDLE COVER
15		842258200	CASE
16		842258067	AIR OUTLET GRATE