CE

MANUALE DI USO E MANUTENZIONE I

USE AND MAINTENANCE MANUAL GB

mase GENERATORS

SILENT 12 DM (TNV ENGINE)

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Codice

GB

INDEX

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This manual has to be preserved for all through life of the gen set to which ago reference

Thank you for having chosen a product MASE.

As a leading generator manufacturer, Mase Generators offers a wide range of generators with an output from 1 KVA portable generators to 1600 KVA units for special applications.
Founded in 1970, the Cesena-based company extends over a area of 16,000 square meters, including a 9,000 sq. mtr. manufacturing facility.
Mase Generators began as a company producing 500 Watt, light and compact portable generators. These generators made the Mase Generators name well known throughout the world. Mase Generators is a leader in high quality, reliable products, and innovative research performed by Research and Development Department.

The generator you have purchased is the fruit of years of experience in the sector and for the modern conception, the strong sizing, the materials employees, the continuous updatings, constitutes an effective answer to the operators' demands of the sector.
This Manual instructions will furnish you useful information and precious suggestions to be able to fully exploit all the possibilities that the generators offers you.
If any part of the manual resulted incomprehensible,please contact us.

In to renew our thanks we cordially greet you.

MASE GENERATORS SPA

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Technical data, informations, layouts of the texts and graphic preparations: edited by the Technical Office Mase Generators

DEFINITIONS USED

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The terms used are current technical terms and where considered necessary, the meaning is described below

- **Generator**
  An assembly of an internal combustion piston engine and an alternate current, synchronous, 2-4 pole, self-excited generator, joined together to create a station for self-production of electrical energy.

- **User system**
  Composed of the power supply circuits of the user equipment, including the relevant sectioning, handling, breaking, transformation, protection, etc. devices which do not form part of the production, transmission and distribution systems.

- **Category 1 electrical system**
  A system where the rated voltage is greater than 50 V and smaller than 1000 V including alternate current.

- **Load**
  A set of numerical values of electrical and mechanical magnitudes which characterise the requirements imposed on a rotary machine by an electrical circuit or by a mechanical device at a certain instant.

- **Thermal switch**
  Main cut-out and breaking device made up of a switch which opens automatically by thermal effect.

- **Differential switch**
  Main cut-out and breaking device made up of a switch which opens automatically by differential effect.

- **Skilled person**
  A person with technical know-how or sufficient experience to allow him to avoid the dangers inherent in electricity.

- **Technician**
  A person with know-how, technical experience and powers to develop the functions that have been him delegated and authorized to release a declaration to the meaning of the normative applicable.

- **mase specialised personnel**
  A person able to evaluate the job assigned to him and recognise the possible dangers on the basis of training at the **mase** training centres, with professional experience and knowledge of the equipment in question and of the possible dangers deriving in the event of negligent behaviour.

- **Supplier**
  A body (e.g. manufacturer, agent, installer) which supplies the equipment or services relating to the machine.

- **Control**
  Control action by which an output variable of the controlled system (controlled variable) is affected by an input variable of the controlling system in order to achieve a certain goal.

- **Manual control**
  Control where the change of a variable handled is produced by a person through manual intervention

- **Automatic control**
  Control where the change of a variable handled is produced by a controlling device (automatic controller) without the intervention of a person

- **Danger**
  Source of possible harm or damage to health

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- **Protection**
  Guard or protection device as safety measure to protect persons from a present or potential danger.

- **Casing**
  Part intended to assure protection of the equipment against specific outside influences and protection in every sense against contacts.

- **Connection in bad state**
  The live parts are not fully covered with insulation removable by destruction only, the connections are not secure because of unstable tightening of the parts and a development of oxide between the parts.

- **Direct contact**
  Contact of persons or animals with live parts

- **Control circuit**
  Circuit used to control machine operation

- **Equipment**
  General term which comprises materials, devices, equipment, accessories and similar used in conjunction with an electrical installation

Symbology used in the manual

Those parts of the text not to be ignored are highlighted in bold type preceded by a symbol, as illustrated and defined below.

DANGER ***Indicates that particular attention must be paid in order to prevent running serious risks which could lead to death or possible harm to the health of personnel.***

WARNING ***A condition which may occur during the lifetime of a product, system or plant considered at risk regarding damage to persons, property, the environment or economic loss.***

CAUTION ***Indicates that particular attention must be paid in order to prevent serious consequences which could result in damage to tangible goods, such as the resources or the product.***

INFORMATION ***Instructions of particular importance.***

Carefully consult this manual before using or carrying out any operation on the generator.

The routine maintenance operations, must be carried out by qualified personnel who have the appropriate equipment and protections.

Because of the intrinsic dangerousness typical of the generator, are wanted to remember that, despite the generator has been projected, built and tested second as established by the norms accident, only a correct and careful use can guarantee the full safety; to such purpose, following the various precautions are brought by to observe during the use of the generator.

PRELIMINARY PRESCRIPTIONS

FIELD OF EMPLOYMENT:

THE GENERATOR IS PROPER FOR TO PRODUCE IN WAY AUTONOMOUS ELECTRIC ENERGY IN THE LIMITS OF TENSION AND WATT DECLARED BY THE BUILDER

Consult this manual carefully before proceeding to the use and to any operation on the genset.

FAILURE TO RESPECT THE SPECIFICATIONS CONTAINED IN THIS USE AND MAINTENANCE MANUAL WILL RESULT IN FORFEITURE OF THE GUARANTEE ON THE PRODUCT.

This manual was drawn up by the manufacturer and forms an integral part of the generator equipment, definition used as indicated in Directive 98/37/EC; the information contained in the manual is addressed to all the persons involved in the operating life cycle of the generator, and is necessary to inform both those who effectively carry out the different operations and those who coordinate the activities, to arrange the necessary logistics and to regulate access to the place where the generator will be installed and operated.

This manual was drawn up by the manufacturer with the purpose of providing essential information and instructions for proper use and maintenance in conditions of safety. It constitutes an integral part of the generator equipment and must carefully be protected from any agent which may damage it for the entire life cycle of the generator. The manual must accompany the generator if transferred to another user or owner.

It is opportune to remember the supplied generator group needs installation.
The technician will release, at the end of the work, a declaration to the meaning of the normative applied.

The manual defines the purpose for which the generator was constructed and contains all the information necessary to guarantee safe and proper use.
Constant observance of the instructions contained in this manual guarantees the safety of the operator, protection against damage to persons or things, operating economy and a longer life of the generator.

The drawings are provided by way of example. Even if the generator in your possession differs from the illustrations contained in this manual in elements of little significance, for example the colour, the safety of the generator and the information provided are nevertheless guaranteed.

To facilitate consultation, it has been divided into sections identifying the main concepts; for a quick look at the topics, consult the index.

Ongoing improvement and development of the product may have led to modifications to the generator which are not included in this publication.

Whenever a problem concerning the generator or this publication arises, consult with Mase Generators SPA for the latest information available.

1. GENERAL SAFETY WARNINGS

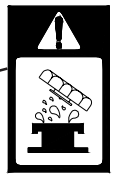
1.1 Symbols on the generator

Cod. 42347

Cod. 41781

Cod. 41776

Cod. 41775



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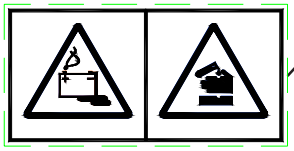

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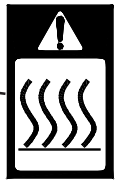

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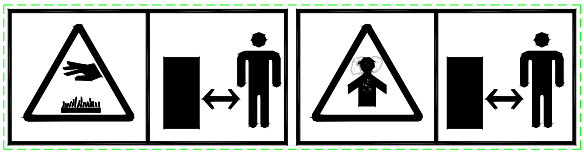

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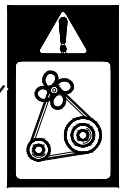

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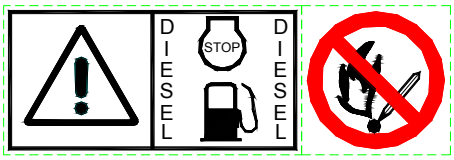

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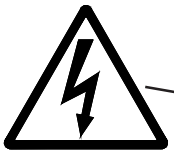
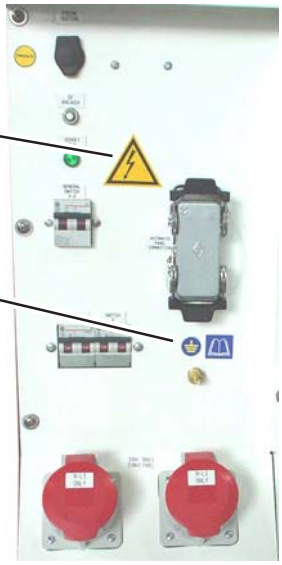
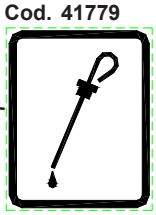




Cod. 42118

Cod. 41779



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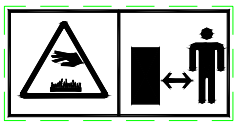
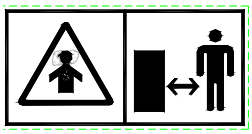
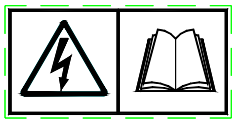
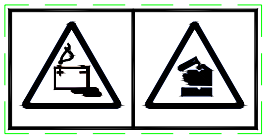
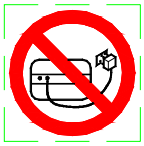
1.2 Position of safety labels

- These labels warn the user of any danger which may cause serious injury. Carefully read the meaning and the precautions described in this manual.

- If the label detaches or becomes illegible, replace it with a new one which can be requested from an authorised **mase** dealer.

Danger Symbols	Meaning
	- Caution to avoid burns, do not touch during operation. The exhaust manifold and the engine, pay attention to the labels on the generator. - Leave the engine to cool down before storing it indoors
	- Read and understand the Use and Maintenance Manual before starting the generator. - The Mase generator has been designed so as to guarantee safe and reliable operation provided that the instructions are followed. Otherwise,personal injury or damage to the equipment may result.
	- Exhaust gas contain carbon monoxide, that is toxic. - Don't turn on the generator in a closed place. - Provide to a good ventilation. If installed indoors, scrupulously observe the ventilation regulations.
	- Danger of electric discharge: consult the manual
	- Danger of sudden starting from the remote control panel. - Before doing any operation on the genset, disarm the remote starting system.
	- Danger of electric shock: consult the manual
	- Danger of burns: Hot surfaces
	- Danger of entangle and cut: presence of rotating parts, pulleys, belts, fan.
	- Danger of burns: possibility of expulsion of hot water in pressure.

	- Danger possible spillages of corrosive acid.
Prohibition Symbols	**Meaning**
	- The connections to an emergency electric net must be effected by specialized electricians and accordingly to the relating norms. Improper connections can cause current return from the generator to the connected electric lines. That can cause electric discharge on those people who works for the electric company or comes contact with the lines during the breakdown. When the line is rehabilitated, the generator can explodes, burns or causes fires in the electric line system.
	- No smoking or use of open flames.
	- Do not clean, lubricate, repair or adjust moving parts.
	- Do not extinguish fires with water, use homologated extinguishers.
Obligation Symbols	**Meaning**
	- Obligation to connect the generator group to earth.
Information Symbols	**Meaning**
	- It indicates the dip stick location for the control of the oil level engine.
	- It indicates the location of a point of lifting of the generator group.

1.3 General danger informations

- It is recommended to learn how to stop and operate all the controls.
- Do not allow unqualified personnel to use the generator.
- Even though the generator is protected, do not stand near it.
- Do not remove the labels for any reason and request replacement if necessary.

- Before starting the Generator or before starting any lubrication or maintenance operation, it is essential that the personnel responsible has read and understood all the WARNINGS, CAUTION and DANGER notices in this manual and in the additional technical documentation provided.

- Before any operation on the generator, ensure that the primary engine is not running and that no parts are moving, and post a sign saying DO NOT SWITCH ON or similar at the start switch or the controls before carrying out the maintenance or repair work on the generator.

- Nevertheless, the manufacturer cannot foresee all the possible circumstances which may lead to potential risks in the effective conditions of use of the Generator.
  Any operations and/or procedures for maintenance not expressly recommended or indicated in the user manuals must always be notified to and approved by the manufacturer.
  In the event that a procedure not specifically recommended needs to be applied, the user is responsible for assuring that such procedure is safe and does not cause harm to persons.

- The manufacturer declines all responsibility for damage to persons or things deriving from inobservance of the safety regulations.

- Carefully examine the safety warning plates on the generator and respect the relevant instructions.

DANGER

1.3.1 Danger of entanglement

- Do not remove the original protections from any of the exposed rotating parts, hot surfaces, air intakes, belts and live parts.
- Do not carry out any maintenance operation with the generator running.
- Do not wear flapping garments, such as scarves, foulards, bracelets, etc. and all garments must be tied with elastic at the edges.
- Do not clean or carry out maintenance on moving parts

DANGER

1.3.2 Danger of burns

- Do not permit unskilled persons or without adequate training to use the generator.
- Do not permit children or animals to approach the generator when it is in operation.
- Never touch the exhaust, the relevant protection or the engine body when the generator is running or still hot.
- Do not lean against or sit on the generator for any reason whatsoever.
- Identify the position of the fire extinguishers or other protection and emergency devices and learn their functioning.
- Identify any sources of danger such as fuel, engine oil or acid solution leaks, condensate in the drip caps, high voltage, high pressure.
- Do not cause short-circuits by placing keys or tools on the batteries or on the cable fittings.
- The battery fluid contains sulphuric acid which is extremely corrosive and harmful to the skin. Always wear protective gloves and be extremely careful to avoid spillage when pouring the acid. In the event of contact, wash the affected part thoroughly with running water and consult a physician, in particular when the eyes are involved.

DANGER

1.3.3 Danger of harm to hearing

- Do not stand near the generator for long periods without protective earmuffs since hearing may be reduced.

DANGER

1.3.4 Danger of intoxication

- The exhaust gases contain toxic carbon monoxide.
- Never use the generator in tunnels or in any place with poor ventilation. If indoor use is inevitable, it is essential to provide for proper and efficient ventilation in order to prevent intoxication of persons or animals.
- Check that the engine exhaust is free and that the pipes allow evacuation of the exhaust fumes.
- Check that the exhaust gases are discharged to the outside in a safe position away from doors, windows and air intakes.

DANGER

1.3.5 Danger of fire or explosion

- Always turn off the engine before refuelling.
- Do not smoke during refuelling.
- Refuelling must be carried out with extreme care, ensuring that fuel does not overflow from the engine tank respecting the maximum level.
- In the event of fuel spillage from the tank, thoroughly dry and clean the parts involved.
- Check that there are no fuel leaks and that the pipes are undamaged.
- When refuelling has been completed, tightly close the fillercap
- Keep flammable liquids, matches and other explosive and/or flammable products away from the generator, since the temperature near the exhaust is high during operation.
- Never leave flammable liquids or cloths soaked in flammable liquids in proximity of electrical equipment (including lamps) or parts of the electrical system.
- The batteries develop hydrogen, a highly explosive gas. It is recommended not to smoke nor cause sparks in the vicinity, in particular during charging.
- Do not obstruct the cooling air inlets/outlets.
- In the event of fire, use a homologated fire extinguisher and never use water.

DANGER

1.3.6 Danger if failing to use personal protection devices

- The persons responsible for handling must always wear protective gloves and safety shoes.
- Wear safety shoes and overalls.
- If the generator needs to be lifted from the ground, the operators must wear a protective helmet.
- Immediately change wet overalls.
- Use protective gloves.

DANGER

1.3.7 Danger caused by the engine starting

- Do not leave disassembled parts, tools or anything else not forming part of the system on or near the engine.
- Install the protections necessary for safety on the parts completing the system.
- Operate the generator on a flat surface as far as possible. For continuous operation, the maximum permitted engine inclination is 20 degrees. Greater inclination of the generator might cause the fuel to leak out or cause problems with engine oil pressure.

- To prevent the risk of fire and for proper ventilation, position the generator at least 1m (3 ft) from buildings or other equipment during operation.
- Check the oil level by means of the dipstick.
- Check that all the electrical utilities are off so that the generator is not started on load.
- Check perfect functioning of the devices which stop the generator in the event of failure due to low oil level.
- Identify the position of the emergency stop buttons, switches and other emergency systems on the generator.
- Learn the special emergency procedures relative to the installation in question.

DANGER

1.3.8 Danger of electromagnetic radiation

- Do not allow access to persons wearing a pacemaker because of possible electromagnetic interference with the device.

DANGER

1.3.9 Danger of electrocution

- When using the generator always bear in mind that in wet or very humid places and in confined conduction spaces it is obligatory to comply with Articles 313 and 318 of Presidential Decree No. 547 27/04/55, as well as Chap. 11 Section IV of the CEI 64-8 regulation.
- Immediately change wet overalls.
- Insulate all the connectors and detached wires.
- Do not leave the power terminal board of the generator uncovered; check that the electrical power and auxiliary service connections have been made properly.
- Do not power loads with a voltage different from that delivered by the generator
- Do not spray water directly onto the electrical parts
- Do not clean the internal electrical parts with compressed air, since short-circuits or other faults may occur. Do not tamper with the active protections, thermal switches and differential magnetothermal switches.
- In the event of malfunctioning, do not remove the panel to attempt repairing it. Contact Mase specialised personnel.
- Do not access the generator with wet hands, since it is a potential source of electric shock if improperly used.
- Take the necessary precautions to prevent the danger of electrocution; check that the earthing system has been installed and constructed in accordance with regulations.
- For the safety of the users, the earth connection of the generator must always be carried out paying particular attention to the cable cross-section used. For the connection of the earth cable use the dedicated terminal on the generator. For the earth connection follow the indications in the table to select the cable cross-section to use depending on the generator power.

The manufacturer is not responsible for any damage caused by failure to earth the system.

DANGER

1.3.10 Danger resulting from bad storage

- Packed and unpacked generators must be stored in a cool and dry place and never exposed to bad weather.
- Avoid stacking packed generators to prevent them from falling causing damage to persons and/or things.

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1.4 Reference documents

The instructions for use provided with each generator are made up of a collection of documents of which this manual represents the General Part. The following documents are normally provided separate.

a **CE** declaration of conformity.
b Instruction manual for use and maintenance of the generators,
(this manual).
c Engine use and maintenance manual.
d List of **mase** Service Centres.
e **Mase** Warranty certificate.
f Warranty card.

1.5 Reference regulations and legislative provisions

The generator groups, built by **mase**, destined to the countries of the European Community, are conforming to the applicable **EC** directives, and they are provided of a **EC** Declaration of Conformity.

98/37/EC and subsequent amendments:
Essential machine requirements for safety and health protection ("Machine" directive).

73/23/EC and subsequent amendments contained in the directive **93/68/EC**: Guarantee of safety of electrical material intended for use within certain voltage limits, ("Low Voltage" Directives).

EN 12601: Generator groups moved by internal combustion engine.

EN 60204.1: Electric equipments of the generator groups.

1.6 Marking

The generator identification plate carries all the identification data in conformity to **ISO 8528** and in accordance with the provisions for **CE** Marking for those cases where required. Below is a facsimile of the identification plate fixed on the hull of each generator (**fig.A**).

1.7 Identification of the generator unit

1 - Machine name
2 - Machine code
3 - Serial number
4 - Rated power
5 - Declared frequency
6 - Rated power factor
7 - Rated voltage
8 - Rated current
9 - Degree of protection
10 - Class of isolation
11 - Temperature max. of use
12 - Altitude max. of use
13 - Performance class
14 - Year of construction
15 - Manufacturer - Adress
16 - Weight

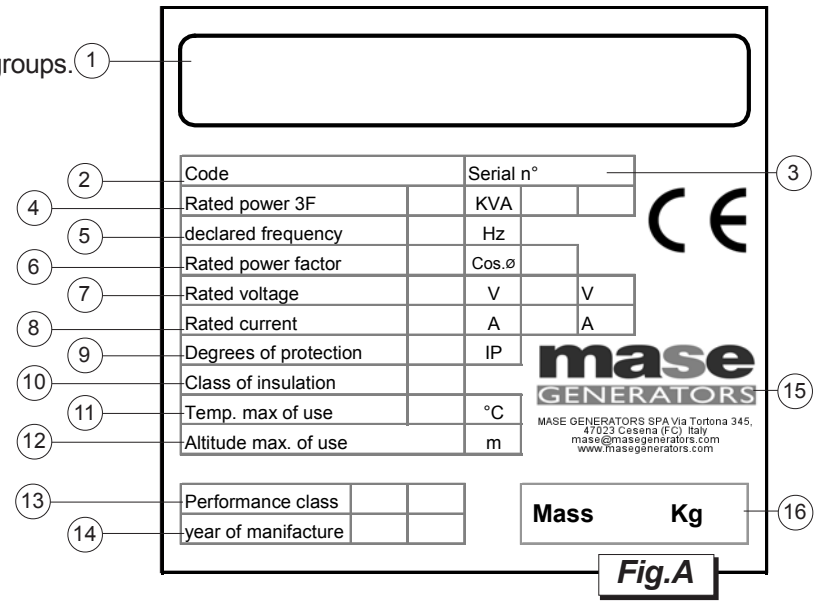

Fig.A

INFORMATION

The machine code number, the serial number and the year of construction must always be indicated when contacting the manufacturer for information, order of spare parts, etc..

2 GENERAL INFORMATION

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2.1 General features

The ***SILENT*** series generators are composed of a diesel-powered combustion engine coupled to an alternator which produces alternating . They have been designed to assure professional users maximum efficiency and reliability for any type of work.
The machine is enclosed in a painted sheet steel casing soundproofed with sound-absorbent material.
The fuel is fed by means of a 12 Volt maccanical pump mounted inside the generator.
The 4-stroke, direct injection diesel engine, constructed by Yanmar, is extremely reliable and strong.
The alternator is type synchronous, 4-pole, brushless and has an electronic voltage regulator (SR7) which guarantees stability of ± 2% with respect to the rated value. The high pickup capacity of the alternator makes the generator particularly suitable to power electric motors of conditioners, desalination plants, compressors, etc.
The generator has a local control panel (**Fig.1,ref.A**) on which the commands and the control instruments are found.

2.2 Conform use

The generator is suitable for independent production of electrical energy within the voltage and wattage limits declared by the manufacturer.
Any other use outside the already stated field of use is prohibited: the generator is intended for industrial use.
The generator has been designed to operate independently (without operator) if not for sporadic checks.
The limits of use are:
- operating temperature: -30° +50°
- relative humidity: 30% - 90%

Arbitrary modifications to the machine are prohibited for safety reasons.
Original spare parts must be used on pain of losing machine conformity.
All the operations that require dismantling of special parts may only be carried out by technicians authorised by the local dealer or the manufacturer.
Only Mase technicians or personnel trained by Mase have the necessary knowledge of the generator and the special equipment as well as the experience to carry out any operation in the most economical and reliable way.

2.3 Residual risks

The generator has been designed taking into account the safety regulations set out in the EC directives and standards; nonetheless, the following residual risks remain:The generator has been designed taking into account the safety regulations set out in the EC directives and standards; nonetheless, the following residual risks remain:

- injury caused by contact with hot parts during maintenance.
- injury caused by electrocution during maintenance on the electric panel.
- risks connected with long periods of exposure to the noise of the generator.
- risks due to contact with the generator lubricants during maintenance.
- risks due to the fire hazard the fuel represents.

Because of the typical intrinsic danger of the Generators, you are reminded that, although the generator has been designed, constructed and tested in accordance with the safety regulations, only proper and careful use can guarantee full safety; to this end, the various precautions to be taken during use of the Generator are listed in **cap.1**.

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2.4 Tables of technical characteristics

MODEL		SILENT 12 DM
GENERAL CHARACTERISTICS		
DIMENSION	L mm	1420
	W mm	658
	H mm	800
WEIGHT	kg	470
DEGREE OF PROTECTION	IP	23
CLASS OF ISOLATION		H
TANK CAPACITY	lt.	30
AUTONOMY AT 3/4 LOAD	h	9
GENERATOR		
TYPE		Synchronous, 4-poles, self-excited, self-regulated
SINGLE-PHASE 230V		
MAX. POWER A.C. [1]	kW	11,4
CONTINUOUS POWER A.C. [2]	kW	10,4
POWER FACTOR		1
THREE-PHASE 400V		
MAX. POWER A.C.	kVA	\
CONTINUOUS POWER A.C.	kVA	\
POWER FACTOR		\
TEMP.MAX OF USE	°C	50
TEMP.MIN OF USE	°C	-30
ALTITUDE MAX. OF USE	mt.	1000
FREQUENCY	Hz	50
EXCITATION		Electronic
ENGINE		
TYPE		4-stroke, direct injection
MANUFACTURER		Yanmar
MODEL		4TNV88
COOLING		Water
DISPLACEMENT	c.c.	1642
n° OF CYLINDERS		3
MAX. POWER	Hp	18,4
RPM		1500
FUEL		Diesel
OIL SUMP CAPACITY	lt.	6,7
STARTING		Electric

(1) Limited - time running power (LTP) ISO 8528-1

It is the maximum power that, under the environment conditions established by the norm ISO 3046/1, the generator group it is able to disburse for a maximum of 500 hours for year, of which a maximum of 300 hours among the interval of maintenance prescribed by the builder. It is accepted the operation to this power conditions the duration of the group.
An overload of the 10% is admitted only for regulation.

(2) first powers (PRP) ISO 8528-1

It is the available maximum power for a variable power cycle that the generator group is able to disburse for a boundless number of hours for year among the interval of maintenance prescribed by the builder and under the environment conditions established by the norm ISO 3046/1. The middle power during a period of 24 hours, doesn't have to exceed 80% of the PRP.
An overload of the 10% is admitted only for regulation.

2.5 Noise emission

Prolonged exposure to noise above 85 dB(A) may cause health disorders. It is in any case recommended to use appropriate protection systems (e.g. headsets, earplugs, etc.).

The values listed are emission levels and not necessarily safe operating levels. Although there is a correlation between emission and exposure levels, this cannot be reliably used to establish whether or not further precautions are required. Among the factors which affect the effective level of exposure of the workforce are the characteristics of the workplace, other sources of noise, such as the number of machines and other adjacent processes, and the time an operator is exposed to the noise. Moreover, the permitted exposure levels may vary from country to country. Nonetheless, this information allows the machine user to better evaluate the danger and risk.

MODEL	SILENT 12 DM
Acoustic power level L_{WA} dB(A)	88
in accordance with Directive 98/37/EC The measurements were made with the generator running and in accordance with Directive 98/37/EC, and regarding the place of testing, the measuring conditions and the instruments in accordance with ISO 3744 of 1995.	
Acoustic pressure level at the operator station L_{pA} dB(A)	79
in accordance with Directive 98/37/EC The measurements were made with the generator running and in accordance with Directive 98/37/EC	

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2.7 Generator composition

See Fig.1,ref.A
The generators are essentially composed of the following components:

1 Fixed frame
2 Engine side chest
3 Lock with key
4 Engine
5 Alternator
6 Emergency button

2.8 Control panel and onboard instrument panel

See Fig.1 ref.B
Each generator is fitted with an instrument panel for the controls with the following components:

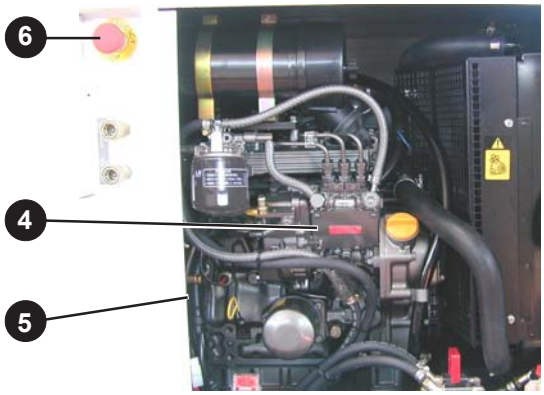
1 - Low voltage termal switch
2 - "RUN" warning light, engine on
3 - General magnetothermal switch 63A, 2P
4 - Earth connection
5 - EC socket 32A 400V, 3P+N+T
6 - Automatic starting control panel socket
7 - Engine Heater Socket
8 - Magnetothermal switch 32A, 2P+T

2.9 Remote control panel

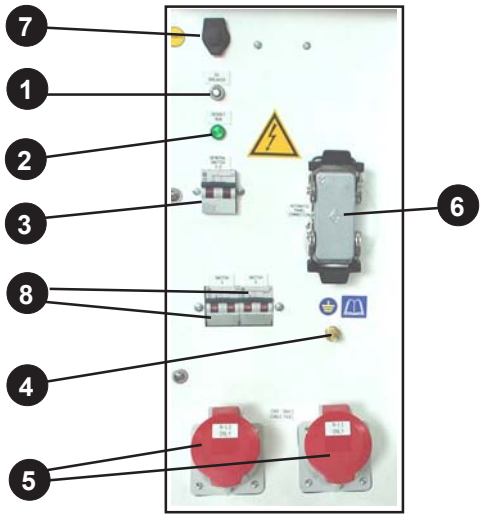
See Fig.1 ref.C
The generator is set up to be connected via connector to the remote starting panel supplied by **mase.**

1 - Remote control panel
2 - Fuel level
3 - Emergency button

"A"



"B"



"C"

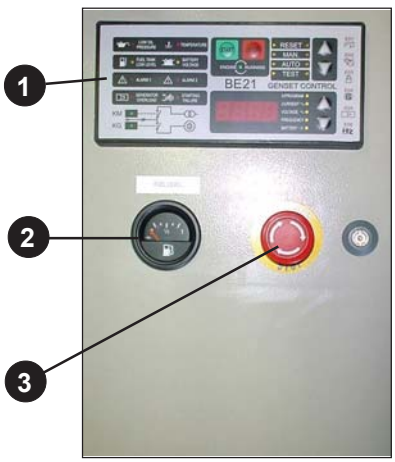


Fig.1

3 INSTALLATION AND SETTING UP

DANGER ***All the instructions provided in the chapter "INSTALLATION" must be carried out by specialised installers only.***

3.1 Features

SILENT is a generator designed for installation on motor vehicles, but can nonetheless be used in a fixed place taking care to leave the cooling air intake and free escape vents . The level of protection against water and entry of foreign bodies is **IP23** which allows using the generator outdoors.

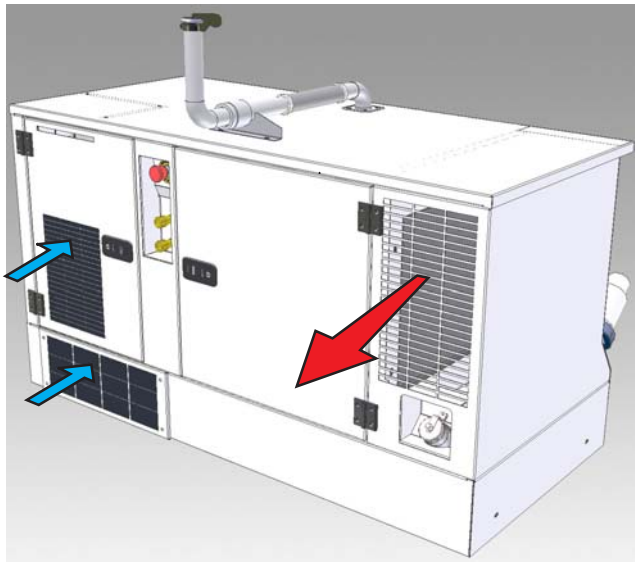
3.2 Ventilation

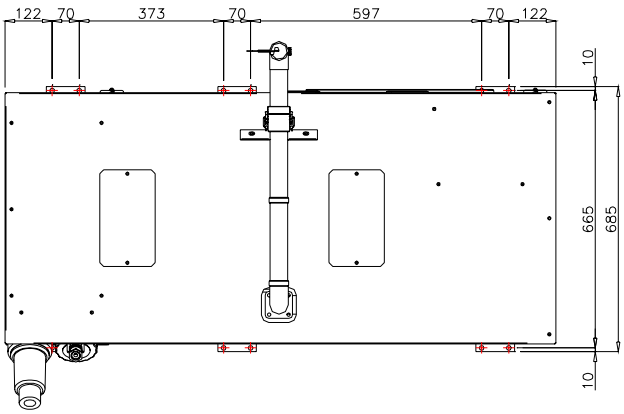
The ***SILENT*** generator is equipped with an internal forced-air cooling system. The air required for cooling and combustion is aspirated into the soundproof casing through the grids "**A**" and expelled through the escape grid "**B**". It is of the utmost importance, for good functioning of the generator, that the air intake and escape grids are always free and away from heat sources.

DANGER ***The cooling air of the generator may contain noxious gas and it must therefore never be used to heat living space. It is recommended to seal the housing in which the generator is installed in order to prevent infiltration of vapours or gas into the living space.***

3.3 Positioning the generator group

The housing in which the ***SILENT*** generator will be installed must have suitable dimensions. The lower part of the housing must have suitable supports to support the weight of the generator and the stress created when the vehicle is running.





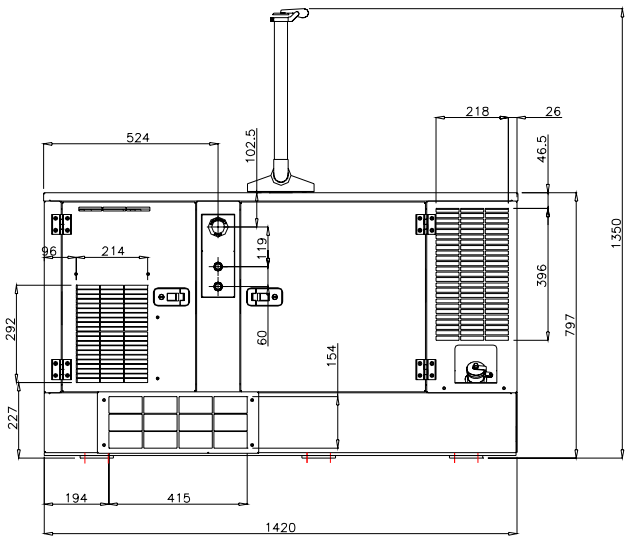


Fig.2

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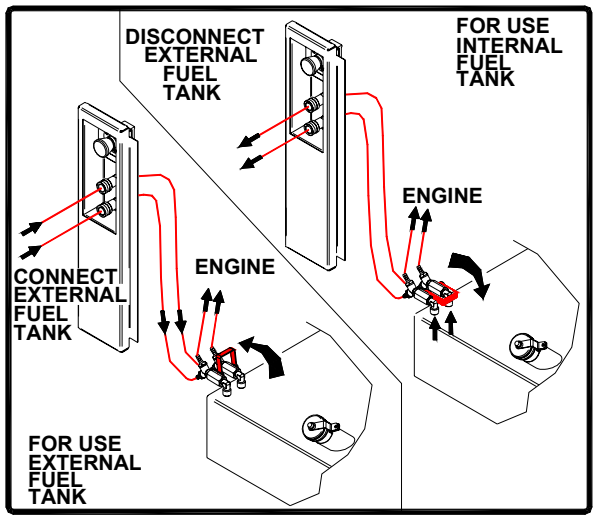
3.4 How to connect to the external fuel tank

The generator is provided of two fittings for fuel inlet and outlet (**ref.1**).
To use the external/internal tank, set the tank valve like shown in illustration.



3.5 Instructions to connect the upper exaust tube

Connect the extension to the exaust tube of the generating set, using the fast connector.

Fig.3

3.6 Electrical connection instructions

Connect the automatic control panel to the generator throught the connector (**ref.1**).
Use a certified cable, with the correct section.
In the control panel (**ref.2**), connect the electricity input using the EC 63A 230V socket (**ref.3**).
Connect to ground using the provided screw (**ref.4**).
See the attached wiring diagram.

3.7 Connecting to the remote control panel

In the control panel, connect the network input (**ref.2**) to the electrical network; connect the output to the loads.
Connect to ground using the provided screw (**ref.4**).
See the attached wiring diagram.

DANGER

In case of maintenance interventions on the generator, disconnect the positive pole of the starting battery, avoiding in this way accidental starting.

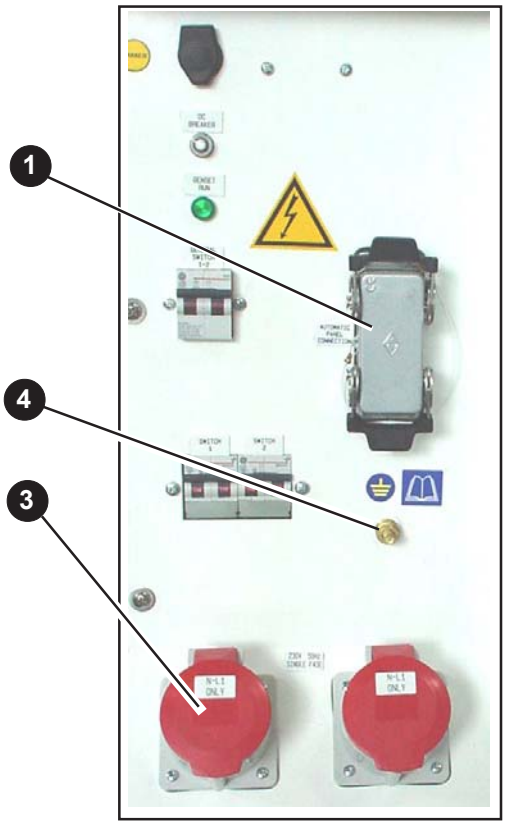


Fig.4

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4. USING THE GENERATOR

WARNING

The "first startup" operations must be carried out by the installer or qualified personnel only

4.1 First startup / diesel fuel bleeding

At first startup or if the generator has stopped due to lack of fuel, proceed as follows:

- Operate manually on the "C" pump of the engine. When the filtres and fuel pipes are full,start the generator group.

Repeat the above operations if necessary.

4.2 Emergency stop

It's possible to stop the generator pushing the emergency button(s) (**ref.1**).

4.3 Protection against short-circuit and overload

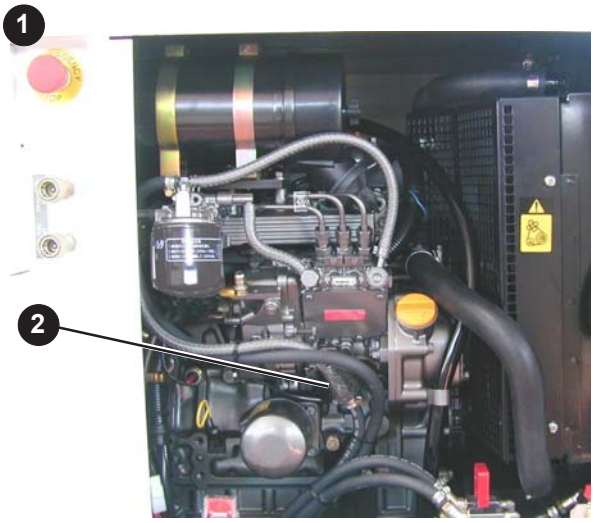
The generator is protected against short-circuit and electrical overload. Magnetothermal switches (**ref.4**) cuts the electrical current when a short-circuit occurs or when the electrical current delivered exceeds the rated value.
Before restoring the contact by lifting the magnetothermal switch lever, disconnect the utilities.

4.4 Protection against short-circuit of the low-voltage electrical system.

In the event of a short-circuit of the low-voltage electrical system a thermal switch (**ref.3**) breaks the circuit stopping the generator.
Before resetting the electrical circuit by pressing the button on the thermal switch (**ref.3**) have a specialised technician find and eliminate the cause of the short-circuit.

WARNING

The generator may only be restarted after having identified and removed the cause of the fault.



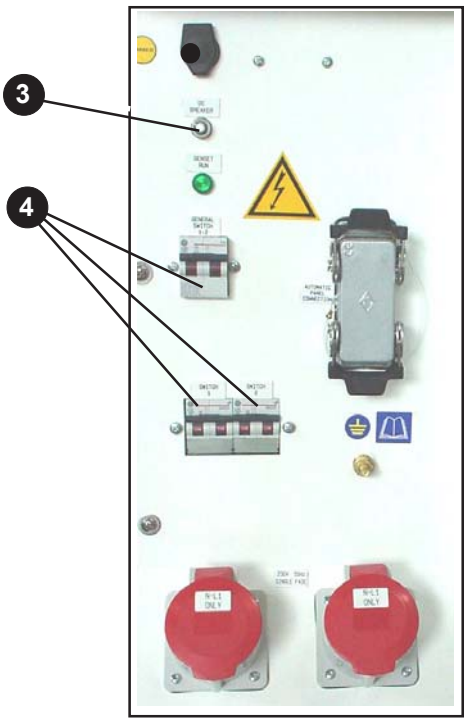


Fig.5

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4.5 Quick guide to the use of "Automatic starting control panel"

For more informations, consult the "Installation manual" provided with the generator.
BE features Automatic Mains Failure and Generating Set control and monitoring. The BE provides visual indication by means of LEDs and Display Messages for the following:

4.6 Operating mode selection

By using the [MODE-UP] and [MODE-DOWN] pushbuttons it is possible to select TEST, AUTO, MANUAL or RESET operating modes. The operating modes are indicated by means of yellow LEDs.
Every time the power supply is switched on, the BE enters automatically into RESET operating mode.

4.7 TEST operating mode

In TEST operating mode, BE starts the engine.
When the genset is running the load will be transferred from the main net to the genset.
All the alarms are controlled.
To stop the engine, the user must select the 'AUTO' (automatic) operating mode: if the Mains stays within the programmed settings the engine will stop after the programmed 'COOLING DOWN' time.
In alternative the engine can be stopped with the MANUAL (manuale) operating mode by pressing the [STOP] pushbutton.
NOTE: In case of emergency it is possible to use the [STOP] pushbutton in 'AUTO' or 'TEST' operating modes. This case will generate the 'ALARM2' alarm to indicate a stop due to the manual emergency stop. To clear the 'ALARM 2' it is necessary to select the 'RESET' operating mode.

4.8 AUTO operating mode (automatic)

The automatic sequences are activated by absence of the main voltage.
In "AUTO" operating mode, the BE can drive periodically the engine start.
During the automatic periodic test the operating mode LEDs will continue to flash.

4.9 MANUAL operating mode

The MANUAL operating mode allows the 'Off-Load' use of the Engine by means of the [START] and [STOP] pushbuttons. To start the engine push the [START] pushbutton until engine starts. To stop the engine push the [STOP] pushbutton until the [STOP] message appears on the display. The BE drives the programmed 'STOP-cycle'.
If the "STOP-cycle" is very long it is possible to cancel it by pressing again the button of [Stop] (only if the engine is still stopped). The BE transfers the Load only to 'AUTO" (automatic) or "TEST" operating mode.

4.10 RESET operating mode (alarmscancellation)

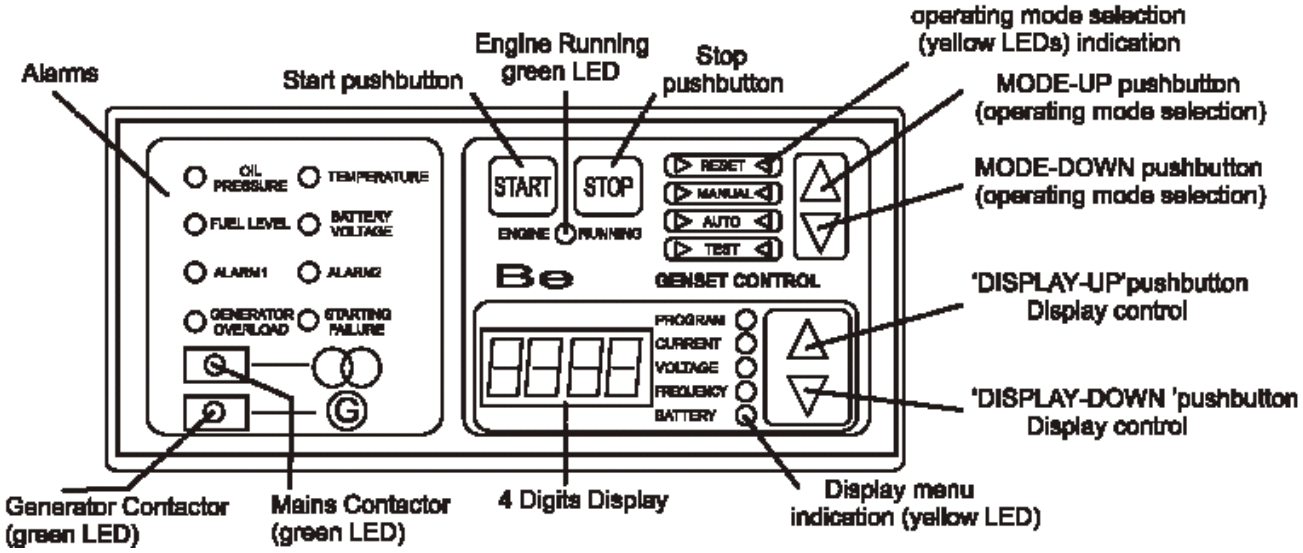
This operating mode clears the fault alarms and resets the BE.
If the BE stays in 'RESET' operating mode for more than 5 minutes, the Display and LEDs are turned off automatically (low power consumption mode).
To set the normal operating mode push the [MODE-UP] or [MODE-DOWN] pushbuttons.
In RESET operating mode, the contact breaker of main network is forced closed indipendently from the state of the main.

4.11 START-STOP pushbuttons

These pushbuttons are used to start and stop the engine.
In 'AUTO' or 'TEST' operating modes, the [STOP] pushbutton will produce an emergency stop and generates the 'ALARM 2' alarm.

4.12 DISPLAY features

The BE features a 4 Digit Display to show parameter settings,measurements and error messages. The [DISPLAY-UP] and [DISPLAY-DOWN] pushbuttons select one of the following menu:
h(hourcounter)-AMPERE(Generator current)-VOLTAGE



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(Generator voltage or Main voltage)-FREQUENCY-BATTERY(Battery voltage or alternator charge voltage). Each menu is indicated by means of a yellow LED.
The operative modes list follows:
h If the operating mode selected is “MAN” (manual), “AUTO” (automatic) or “TEST”, the Display shows the ‘HOUR COUNT’ of the electrogen group.
If the operating mode is “RESET”, display indicates the programmable parameters.
CURRENT: The Generator Current measurement is displayed up to 1000Aac.
VOLTAGE: The Voltage of the MAINS or GEN-SET is displayed. If the fuel solenoid is energised (due to a start request) the display shows the voltage of the generator. Otherwise, the display shows the voltage of the Mains. The range is 80Vac up to 500Vac.
To avoid confusion, the GENERATOR voltage is displayed like [GXXX] and the MAINS voltage like [MXXX] (XXX indicates an entire number of three digits).
FREQUENCY: The Frequency measurement of the Generator is displayed. The resolution of measure is 0.1Hz. The reading of the measure is activated with generator voltage up than 80 Vac.
BATTERY: The Battery or Charger Alternator voltages are displayed. The display shows,normally, the battery voltage. By pushing and holding the [DISPLAY-DOWN] pushbutton the Charger Alternator voltage is displayed.

4.13 DISPLAY messages

Some alarms are displayed by means of a message ‘EXX’. ‘E’ is the indication of error or alarm, ‘XX’ means a number or a code. The BE can show the following:
[E 01] (OVER-FREQUENCY). The source of the alarm comes from the frequency of the Generator. The protection is delayed by 2 seconds. The alarm is always controlled.
[E 02] (BELT BREAK). There is a ‘Belt Break’ alarm when the alternator of battery charge doesn’t give voltage. The alarm is delayed by 20 seconds to prevents false trigger of the alarm.
[E 03] (EXTERNAL BLOCK). The BE actives a “STOP CYCLE” and blocks all the functions.
[E 04] (ALTERNATOR FAILURE). E04 comes displayed if the voltage or the frequency of the alternator lacks for 150 seconds after the engine has been started.
The engine will be stopped.
[E 05] (GEN-SET OVERLOAD). If the current of the Generator is over the setting for at least 6 seconds, the engine will be stopped.
In “AUTO” operating mode the engine will be stopped after cooling down time. In “MAN” operating mode the engine will be stopped immediately.
[E 06] (UNDER FREQUENCY) The protection is delayed by 6 seconds and works only if the contactor is closed (AUTO or TEST operating modes).
The engine shuts down after a cooling down time.
[Hi U] (OVER VOLTAGE) If the Generator voltage is over the setting for at least 2 seconds, will be displayed the message [Hi-U],
[Lo U] (UNDER VOLTAGE or SHORT CIRCUIT) The alarm energises only with contactor of the generator closed (“AUTO” or “TEST” operating mode) if:
- the voltage drops under the setting for more than 6 seconds
- the voltage drops under the setting (minus 20%) for more than 1 second

The BE opens the contactor of the Generator and stops the engine after the cooling down time.
[Err] (MEMORY ERROR) This message indicates an internal failure of the memory. It is possible to restore the normal operating mode of the memory by disconnecting the battery and re-connect it supply after some minutes.
BE features additional messages to inform about particular functions:
[M-on] (MAINS SIMULATION).
[‘ ‘ ‘ ‘] (GLOW PLUGS). The BE21 is driving the GLOW PLUGS.
[——] (V-METER out of range). The voltage (Mains or Generator) drops under 80Vac (over scale)
[StA-] (START). The BE is driving the start cycle.
[StOP] (STOP). The BE is driving the stop cycle.

4.14 LEDs for visual indications

LOW OIL PRESSURE [Red LED]. Indication of Low Oil Pressure alarm.
HIGH ENGINE TEMPERATURE [Red LED]. Indication of High Temperature alarm.
STARTING FAILURE [Red LED]. This alarm is activated if the engine does not start after a complete starting cycle.
OVERLOAD [Red LED]. When active, is displayed OVERLOAD alarm. The connector will open and the engine will shut down.
BATTERY [Yellow LED]. The alarm settings are set to 11,8/15.0V. The alarm is delayed by 120 seconds to avoid false interventions.
ALARM 1, ALARM 2 [Red LEDs]. These are indications of Alarm1 e Alarm2.
‘ALARM 1’ is by-passed timer after the engine has been started. **‘ALARM 2’** is due also by using the STOP pushbutton in “AUTO” or “TEST” operation mode.
ENGINE RUN [Green LED]. Engine running
FUEL [Yellow LED]. This is an optical warning indication of Low Level Fuel.
The generating set stops if the contact stays closed for at least 5 minutes continuously.
CONTACTOR of the MAINS ‘KM’
(green LED illuminated=CLOSED)
CONTACTOR of the GENERATOR ‘KG’
(green LED illuminated=CLOSED)

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5. CARE AND MAINTENANCE

5.1 Preamble

DANGER

Before starting maintenance work on the generator, lock it by pressing the emergency button!

DANGER

Failure to observe this procedure, may result in accidental starting!

DANGER

Any maintenance operation on the generator or the electrical line must be carried out with the engine off after leaving it to cool down sufficiently and after disconnecting the battery from the generator.
This type of operation must be carried out by authorised and duly trained personnel.

It is recommended to scrupulously follow the instructions in the manual provided by the engine manufacturer with each generator.
It is important to regularly inspect and carry out maintenance on the generator. The frequency of maintenance should be decided on the basis of the number of hours of operation.

5.2 Ordinary engine maintenance

The periodic maintenance operations to be carried out on the engine are indicated in the table in point **fig.8**. For more detailed information consult the manual provided by the engine manufacturer with each generator.

WARNING

- ***Check the oil level with the cap/dipstick (fig.7ref.2). The oil level must always be between the MAX and MIN notches on the dipstick (fig.7ref.4).***
- ***When checking the oil level, ensure that the generator is positioned horizontally.***

5.3 Engine oil change

Use diesel engine oil
Top-up and fill through the hole indicated in **fig.7 ref.3**. For detailed information in this connection, consult the engine use and maintenance manual which accompanies the machine.
It is recommended to drain the oil when it is still sufficiently warm to flow easily.

INFORMATION

Always check correct viscosity of the engine oil in relation to the range of ambient temperatures in which the generator operates as indicated in the table.

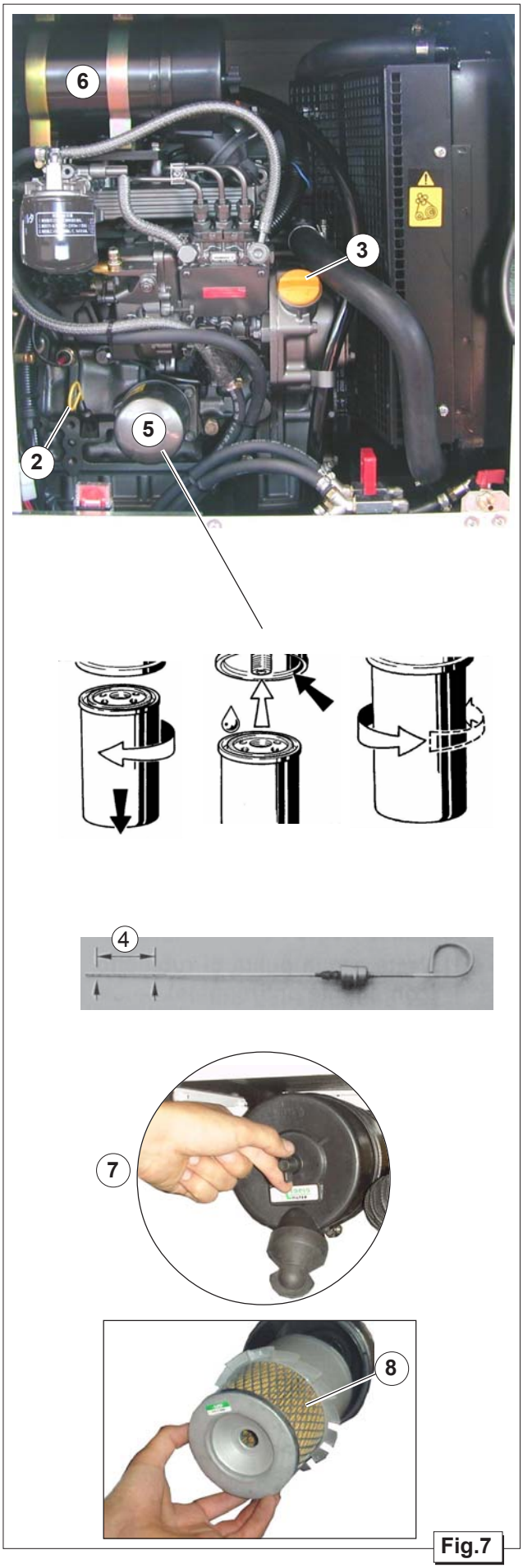

Fig.7

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WARNING

Dispose of the used oil in an appropriate manner, since it is a polluting product.
Take the used engine oil to special collection centres for disposal.

CAUTION

Protect the hands from contact with oil by wearing gloves. In the event of accidental contact with engine oil, thoroughly wash the affected part with soap and water.

CAUTION

During oil top-up and refuelling, respect the maximum level indication. An excessive quantity of engine oil may cause damage to the engine.

5.4 Oil filter replace

To replace the oil filter see tab **fig.8**
The oil filter is accessed by removing the retaining screw (**fig.7 ref.5**).

5.5 Air filter replace

For proper functioning and a long life of the engine it is important to periodically clean and replace the air filter. An inefficient filter may cause loss of engine power and excessive smoke at the exhaust.
To replace the air filter (**fig.7 ref.6**), carry out the following operations:

- Remove the cover from the filter holder by unscrewing the screws (**fig.7 ref.7**).
- Remove the filter, extracting it from its housing and clean or replace it (**fig.7 ref.8**).
- The paper element is cleaned with a blast of dry air, from the inside to the outside, with a pressure not exceeding 2 bar. Should it be very dirty or have holes, replace it.
- Position the filter and reassemble the cover.

WARNING

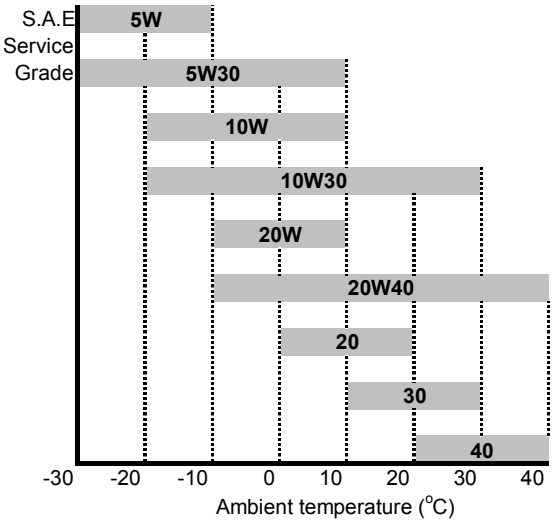
Replace the air filter for the first time after 50 hours of operation, then every 200 hours of operation. Reduce the intervals if the generator operates in particularly dusty environments.

CAUTION

Never turn on the engine without the air filter, otherwise it would cause serious damage to the engine.

5.6 Replacing the fuel filter

To assure a long life and proper functioning of the engine, it is extremely important to periodically replace the fuel filter cartridge, respecting the frequency indicated by the engine manufacturer as listed in the table in fig.8



OPERATION	hours
Check level oil	10
Check level refrigerant liquid	10
Check liquid battery	50
Check trapezoidal strap 🛠	100
Substitution I oil carter 🛠	200
Substitution refrigerant liquid 🛠	anno
Substitution filter oil 🛠	400
Substitution I filter air	400
Substitution combustible filter 🛠	400
Record game balance wheels 🛠	400
Setting and cleaning injector 🛠	400

(*) To perform the change oil the first time after 20 hours of job.

Fig.8

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This operation is carried out following the steps below:
- close the fuel cock if provided by the installer.
- unscrew with a special wrench and replace **(ref.1**).
- remove the old cartridge and position the new one.
- for reassembly repeat the operations in reverse order.

When the cartridge has been replaced, the fuel feed system must be bled following the operations described in Paragraph **4.1** for first starting.

CAUTION

Do not let the skin come into contact with the fuel. During maintenance operations wear protective gloves and glasses. In the event of accidental contact with fuel, thoroughly and immediately wash the affected part with soap and water.

CAUTION

When the operation has been completed, thoroughly clean off any traces of fuel and dispose of the used cloths at special Collection Centres

5.7 Bleeding the fuel system

INFORMATION

The fuel system is developed to eliminate, in autonomous way, air bubbles penetrated inside the system. For automatic bleeding activate the fuel pump for few minutes before starting the engine. To activate the fuel pump press for a moment the "START" button.

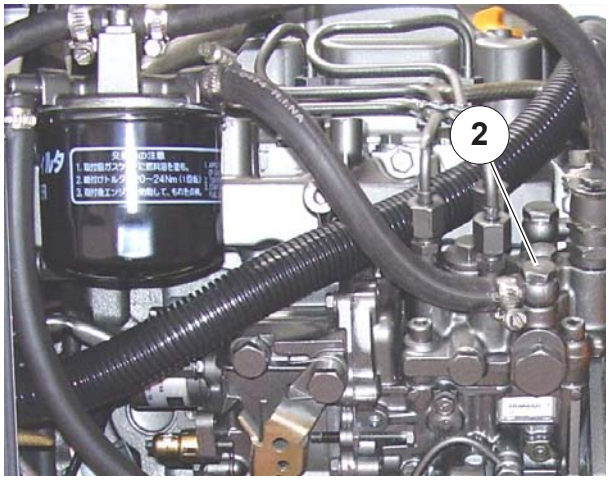
For the manual bleeding activate the fuel pump and loosen the screw (**ref.2**).
If there are air bubbles in the fuel system, the engine will not function regularly or will be unable to reach the rated rpm. Air may penetrate the fuel circuit through a not perfectly sealed joint (pipe, filters, tank) or when the fuel in the tank is at minimum level.

5.8 Cleaning oil/water separator

Periodically wash the oil/water separator element and inside cup with clean fuel oil.
1) Prepare a waste fuel container
2) Close the fuel cock (**ref.3**)
3) Loosen the drain cock (**ref.4**) and drain
4) Turn the retaining ring (**ref.5**) counter-clockwise and remove the cup (**ref.6**). (Keep the float ring (**ref.7**) at hand).
5) Wash the element and inside cup with clean fuel oil. Replace the element with new one if any damaged.

WARNING

Do not let the skin come into contact with the fuel. During maintenance operations wear protective gloves and glasses. In the event of accidental contact with fuel, thoroughly and immediately wash the affected part with soap and water. When the operation has been completed, thoroughly clean off any traces of fuel and dispose of the used cloths at special Collection Centres.



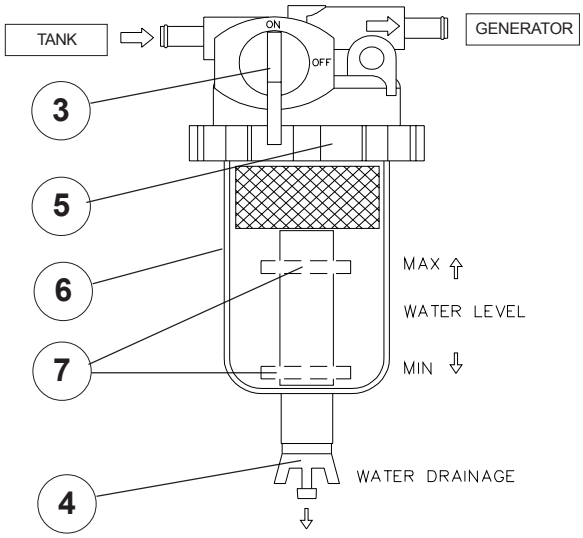


Fig.9

5.9 Electric Pump

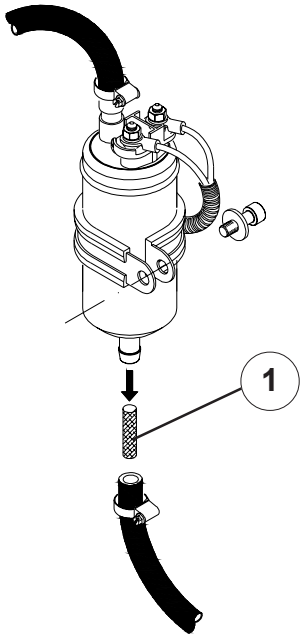
The electric pump is equipped with a protective filter (**ref.1**).

CAUTION

The electric pump is cooled and lubricated with the fuel. Do not activate the pump without fuel in order to not damage it.

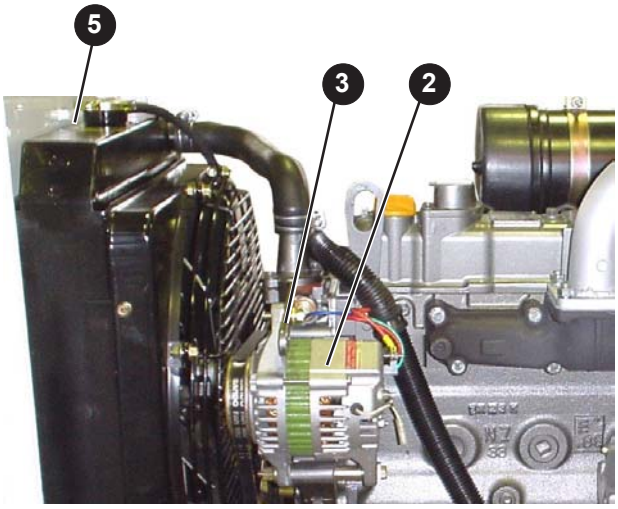
INFORMATION

The feeding system has been developed for blow out, in autonomous way, the air beads penetrated inside the system. Activate the fuel pump for few minutes before starting the generator to have automatic bleeding.
To activate the fuel pump press the "START" button for a moment.



5.10 Checking the V-belt tension

The belt is used to transmit the rotary motion from the pulley of the drive shaft to that of the closed-circuit fluid pump and the battery charger DC alternator (**ref. 2**).
Adjust the belt tension as follows:
loosen the adjusting screw (**ref.3**)and move the battery charger DC alternator (**ref.2**)outwards to increase the tension and inwards to decrease it.
The belt tension is right when it allows, under a thrust force of **8 kg**, a yield of about **10 mm**.



INFORMATION

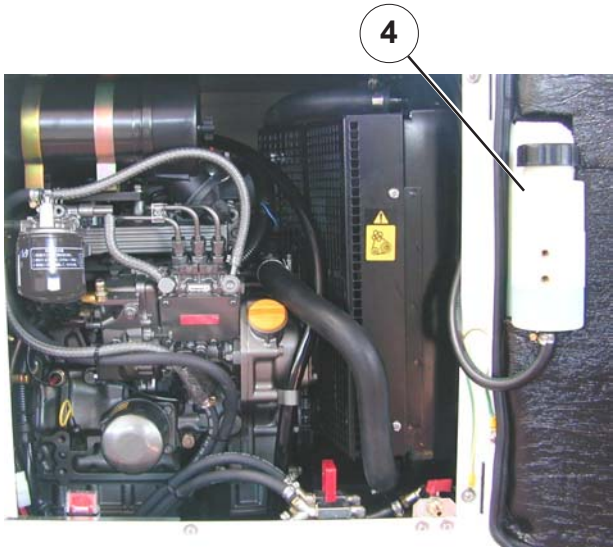
To prevent the belt from idling, do not spill any oil on it. Clean the belt with petrol if it has oil on it.

DANGER

Keep the hands away from the V-belt and the pulleys once the engine has started.

5.11 Coolant check

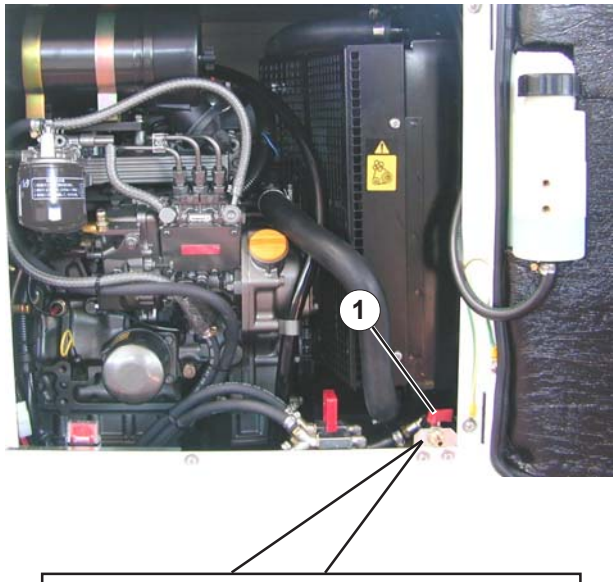
Check the coolant with the engine off and cold.
Each time the generator is used check the coolant level which must be at about 2/3 above the height of the cup located above the radiator (**ref.4**), which functions as expansion tank. When the level in the radiant block goes down notably, top up bearing in mind that overfilling the cup may cause a quite normal outflow of excess water from the drain pipe during operation.

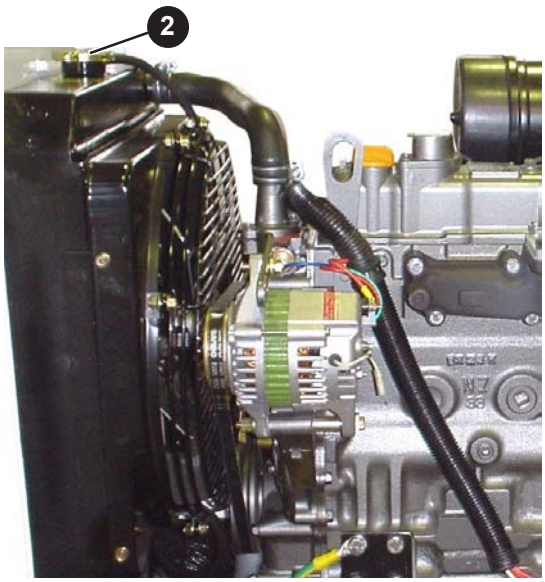


DANGER ***Never open the cover of the radiator (ref.5) and of the expansion vase when the engine is hot to avoid dangerous spillages of coolant.***

5.12 Coolant replace

Replace the coolant every year inside the closed circuit of cooling.
To change used coolant, first drain the system through the tap (**ref.1**).
When the operation has been completed, close the tap.
Now pour new coolant into the circuit through the radiator cap (**ref.2**).





INFORMATION
Dispose of the used refrigerant liquid in an appropriate manner, since it is a polluting product.
Take the used refrigerant liquid to special collection centres for disposal.

5.13 Alternator maintenance

The alternator used on this model is the synchronous, self-excited type with electronic voltage control. This model alternator, without manifold and brushes, does not require particular maintenance operations. The checks and periodic maintenance is limited to removing any traces of damp and oxidation which might damage it.

5.14 Battery maintenance

The generator is supplied with a battery without acid .

INFORMATION ***Have the battery activated by staff prepared with sulphuric acid for batteries and the appropriate tools.***

DANGER ***Battery fluid is a corrosive acid, extremely harmful to the skin.***
Always wear protective gloves and be extremely careful to avoid spillage when pouring the acid.

WARNING
- ***Do not disconnect the battery when the generator is running; the battery charger alternator and the electronic equipment may irreparably be damaged.***
- ***Respect +/- polarity when connecting; failing this will cause a short-circuit when starting, which will irremediably damage the electronic equipment.***

DANGER ***Do not cause short-circuits by placing keys or tools on the batteries or on the cable fittings.***

INFORMATION ***The terminals and the connections must always be maintained dry and clean; to prevent oxidation, clean and smear the terminals with a film of vaseline.***

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5.15 Long period of inactivity

If the generator is not to be used for long time, do the following operations.
- Change the engine oil.
- Clean the air filter.
- Disconnect the battery cables. We recommend you recharge the battery every month in order to prevent it from going completely flat which, sometimes, compromises its integrity.
- Clean the outside of the generator, removing all dust and impurities.

6 ANOMALIES, CAUSES AND REMEDIES

6.1 Breakdown table

The starter motor turns but the main engine does not start
- Check that there is fuel in the tank. (Fill up)
- Check that the stop solenoid valve is powered. (Consult Service Centre) (**fig.10,ref.1**)
- Check fuel pump functioning. (Consult Service Centre)
- Perform operations of drainage from air beads inside the fluel circuit (**see par. 4.1**)

BE is not activated
- Check if the thermal interrupter (**fig.10,ref.2**) of protection is open. (To restore the contact press on the button).
- Check the cables and the clamps of connection to the battery and the electric connections. (Reconnect).
- Check the integrity of the battery. (Recharge or Replace).
- Turn the switch (**fig.10,ref.5**) on 1 (**ON**).

The generator switches off during the operating period
- Check if a protection has been activated with the lighting of the relative warning light. (Remove the cause and retry the starting)
- Check if there is fuel in the tank. (Fill up).

There is high smoke emission from the exhaust.
- Check the air filter. (Clean its elements or, if necessary, replace them).
- Check that the oil level does not exceed the **MAX** notch. (Bring it down to the correct level).
- Check the generator group is not overloaded.
- Check the setting of the injectors. (Consult Service Centre).

The engine runs irregularly
- Check the fuel filter (**fig.10,ref.4**). (Replace it)
- Check the air filter. (Clean its elements or, if necessary, replace them).
- Perform operations of drainage from air beads inside the fluel circuit (**see par.4.1**)

The tension of the alternator is too much low.
- Correct the value of the tension acting on the electronic regulator.
- Check the rpms of the engine (1560 rpms without connected loads).
- Regulator of tension damaged (Replace).

Starter battery flat.
- Check the electrolyte level in the battery. (Fill up).
- Check the battery charging device. (Replace).
- Check integrity of the battery.

The generator does not deliver power to the outlets.
- Check that the differential magnetothermal switch, or a magnetothermal switch, is in the **ON** position. (Consult Service Centre).

When the power fails the generator DOES NOT start.
- Check that the automatic control unit is in "automatic" mode. *Set "AUTO".*
- Check if there is an alarm in the automatic control unit memory. *Reset and select "AUTO".*
- Check that the automatic control unit is on. *Call the Service Centre.*
- Check the generator. *Consult Service Centre.*

When the power is restored the generator DOES NOT turn off.
- Check that the power has actually been restored.
- Wait for the generator to cool down. *Consult Service Centre.*

No power delivered to the utilities.
- Check that there is mains power.
- Check that the automatic control unit is in "AUTO" OPERATING MODE. *Set to "AUTO" MODE.*
- Check that the automatic control panel is intact. *Consult Service Centre.*
- Check the connections. *Consult Service Centre.*
- Check that the mains/generator/utility line switches are energised. *Set the main switches to position 1.*

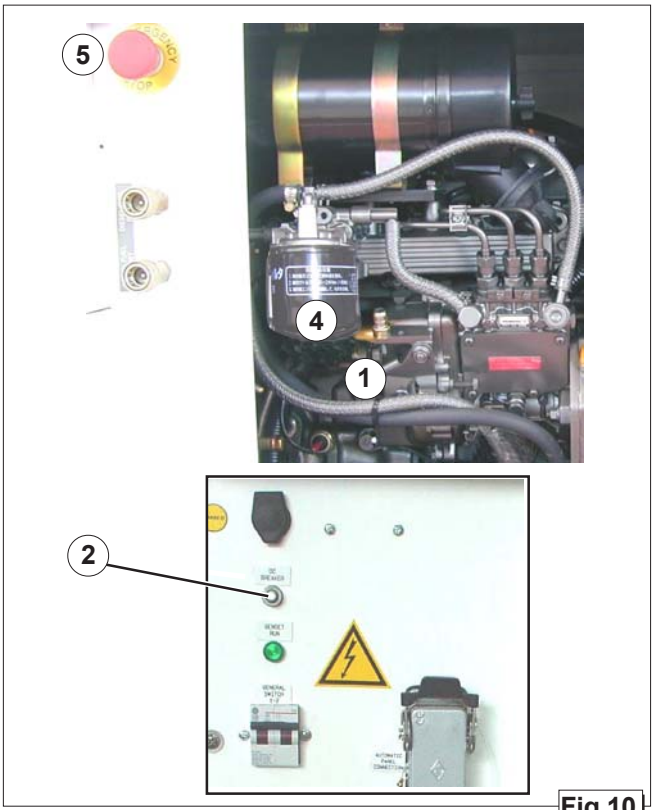

Fig.10

7. WIRING DIAGRAM

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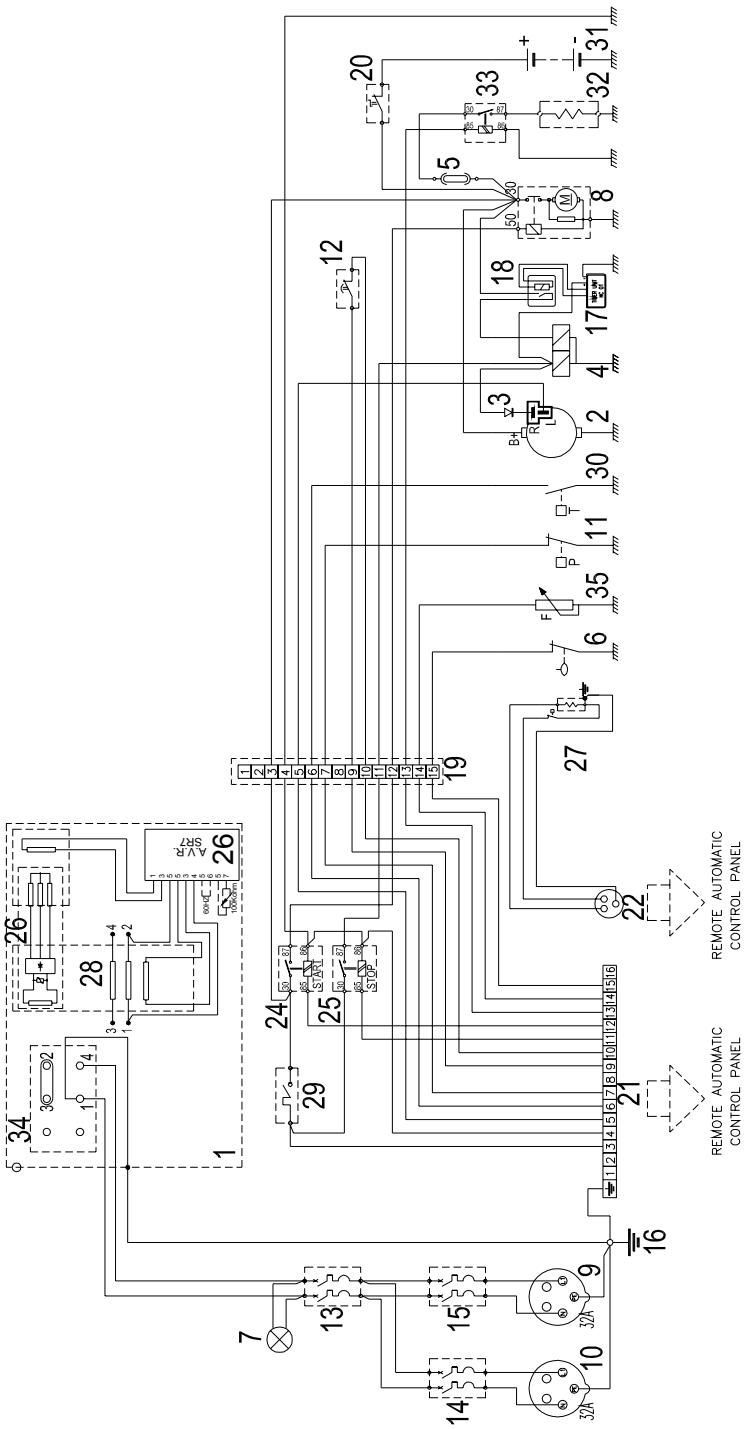

1	ALTERNATOR	13	MAGNETOTHERMAL SWITCH 2P	24	START RELAY
2	BATTERY CHARGER ALTERNATOR	14	MAGNETOTHERMAL SWITCH 2P	25	STOP RELAY
3	DIODE	15	MAGNETOTHERMAL SWITCH 2P	26	ROTOR
4	STOP ELECTROMAGNET	16	GROUND CONNECTION	27	ENGINE HEATER
5	FUSE	17	TIMER UNIT	28	STATOR
6	RESERVE FLOAT	18	RELAY	29	THERMAL SWITCH
7	PILOT LIGHT	19	15 POLES CONNECTOR	30	ENGINE THERMOSTAT
8	STARTER MOTOR	20	BATTERY SWITCH	31	BATTERY
9	SOCKET 3P+N+GND 32A	21	16 POLES CONNECTOR	32	PREHEATING
10	SOCKET 3P+N+GND 32A	22	ENGINE HEATING	33	RELAY
11	OIL PRESSURE SWITCH	23	ELECTRONIC VOLTAGE REGULATOR	34	ALTERNATOR TERMINAL BOARD
12	EMERGENCY STOP BUTTON			35	FUEL LEVEL SENSOR

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8. TRANSPORT. STORAGE. LIFTING AND HANDLING

8.1 Transport and storage

Transport: During transport the generator (with or without packaging) must be protected against atmospheric agents, it must not be turned upside down and must be protected against knocks.

Packaging: Supplied directly by Mase Generators.
The total weight of the packed generator is given in **Paragraph 2.4 "Table of technical characteristics".**
***It is strictly prohibited to pollute the environment with the packaging*.**

Storage: The generator must be stored in horizontal position and away from atmospheric agents and humidity.

8.2 Lifting and handling

CAUTION

Always check that the capacity of the lifting means and its accessories is greater than the weight of the generator printed on the identification plate.

Use a lift truck to handle the generator (with capacity greater than the weight of the generator indicated in the table of technical characteristics (**Paragraph 2.4**) of the Use and Maintenance Manual), inserting the forks under the base at the lower part of the generator.

For handling on level ground, a transpallet is sufficient with a suitable capacity according to the table of technical characteristics (**Paragraph 2.4** of the Use and Maintenance Manual).

N.B. The centre of gravity of the generator corresponds to about the centre of its geometrical volume.

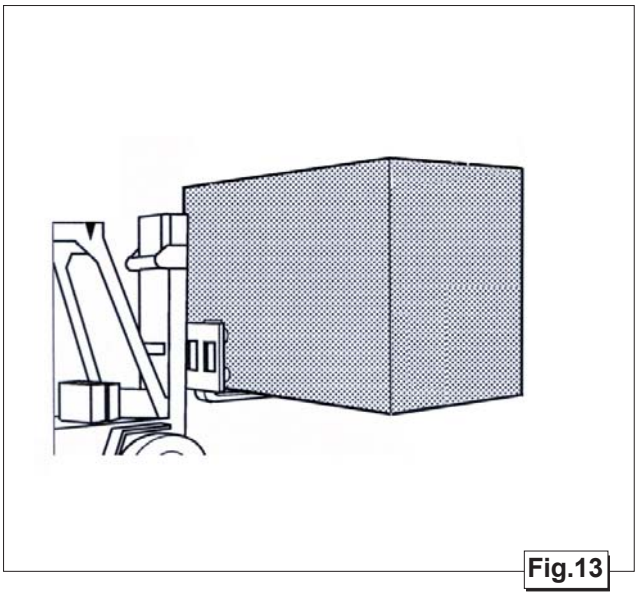

Fig.13

9 GUARANTEE AND RESPONSIBILITY

9.1 Guarantee

- **The MASE** generators and all their components are guaranteed free of defects and are covered by the guarantee for a period as required by current legislation from the date of installation.

- Not covered by the guarantee are: failed observance of the installation regulations, damage caused by natural disasters, accidents, defects of the electrical system including the load to which the generator is connected, negligence, improper use or abuse by the operator and damage caused by repairs carried out by unqualified personnel.

- Repairs that cannot be carried out at the place of installation can be carried out at MASE laboratories or at authorised workshops. Transport expenses will be borne by the Customer.

- Under no circumstances does the Customer have the right to claim compensation for damages or side effects caused by use of the machine in a manner not conform to what is described in this manual.

9.2 Limits of responsibility

MASE GENERATORS S.p.A is responsible for anything regarding the safety, reliability and performance of the Generator on the condition that:

- The generator is used by persons trained through the use and maintenance manual.

- The installation is carried out according to MASE instructions.

- The service procedures are carried out exclusively by MASE specialised technical personnel.

- The electrical system and the loads to which the generator is connected is in conformity with the applicable CEI regulations.

- The Generator is installed and used in accordance with the installations provided in this manual.

- Use original spare parts specific to each model.

- Use suitable fuel.
  Diesel fuel conforming to standards ASTM A975.

10. DISPOSAL

10.1 Disposal of the waste materials deriving from maintenance and scrapping

- The packaging used for transport is biodegradable and thus easy to dispose of by companies authorised for paper collection.

- The batteries must be disposed of according to the regulations regarding toxic and noxious waste.

- The engine oil and engine oil filters, both after an oil change and when scrapping, must be taken to companies authorised for this collection.

- The electrical components must be taken to companies authorised for the collection of electronic material.

- All the painted metal parts must be taken to companies authorised for the collection of metals.

- Any other material not listed above must be taken to companies authorised for the collection of industrial waste.