

|                |              |
|----------------|--------------|
| <b>IS 11</b>   | <b>50 Hz</b> |
| <b>IS 13.5</b> | <b>60 Hz</b> |
| <b>IS 15</b>   | <b>50 Hz</b> |
| <b>IS 18.5</b> | <b>60 Hz</b> |
| <b>IS 21</b>   | <b>50 Hz</b> |
| <b>IS 23</b>   | <b>60 Hz</b> |

## INSTALLATION MANUAL

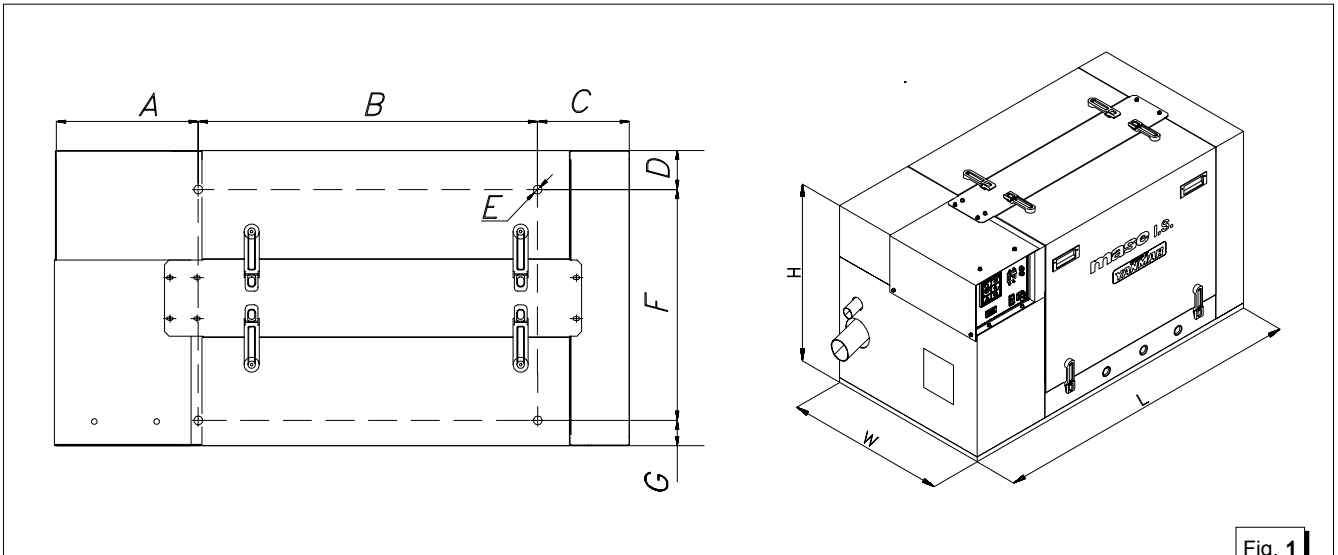


Fig. 1

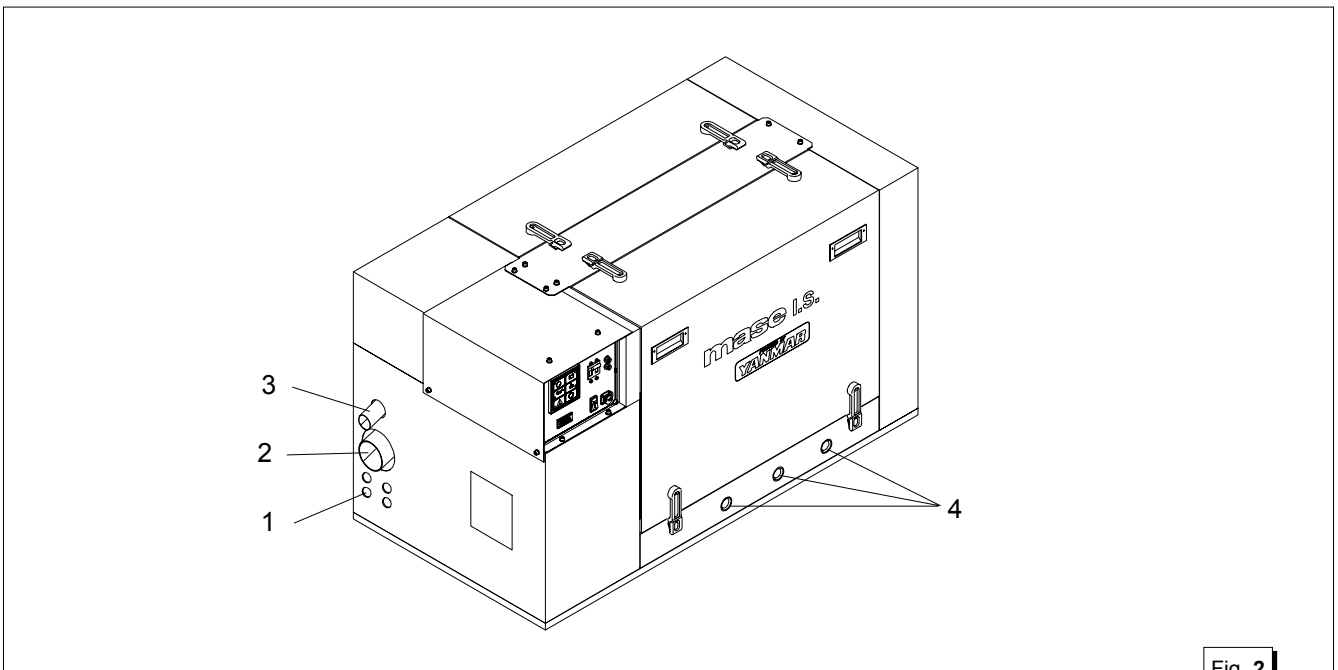


Fig. 2

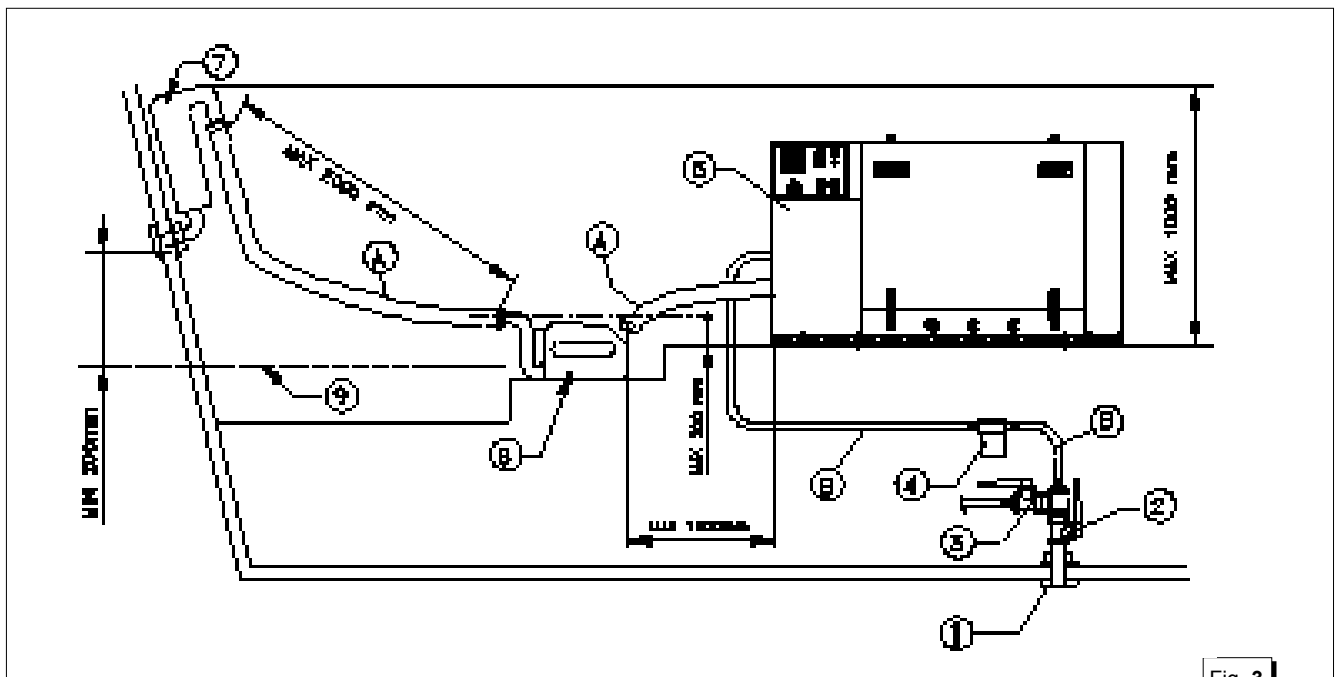


Fig. 3

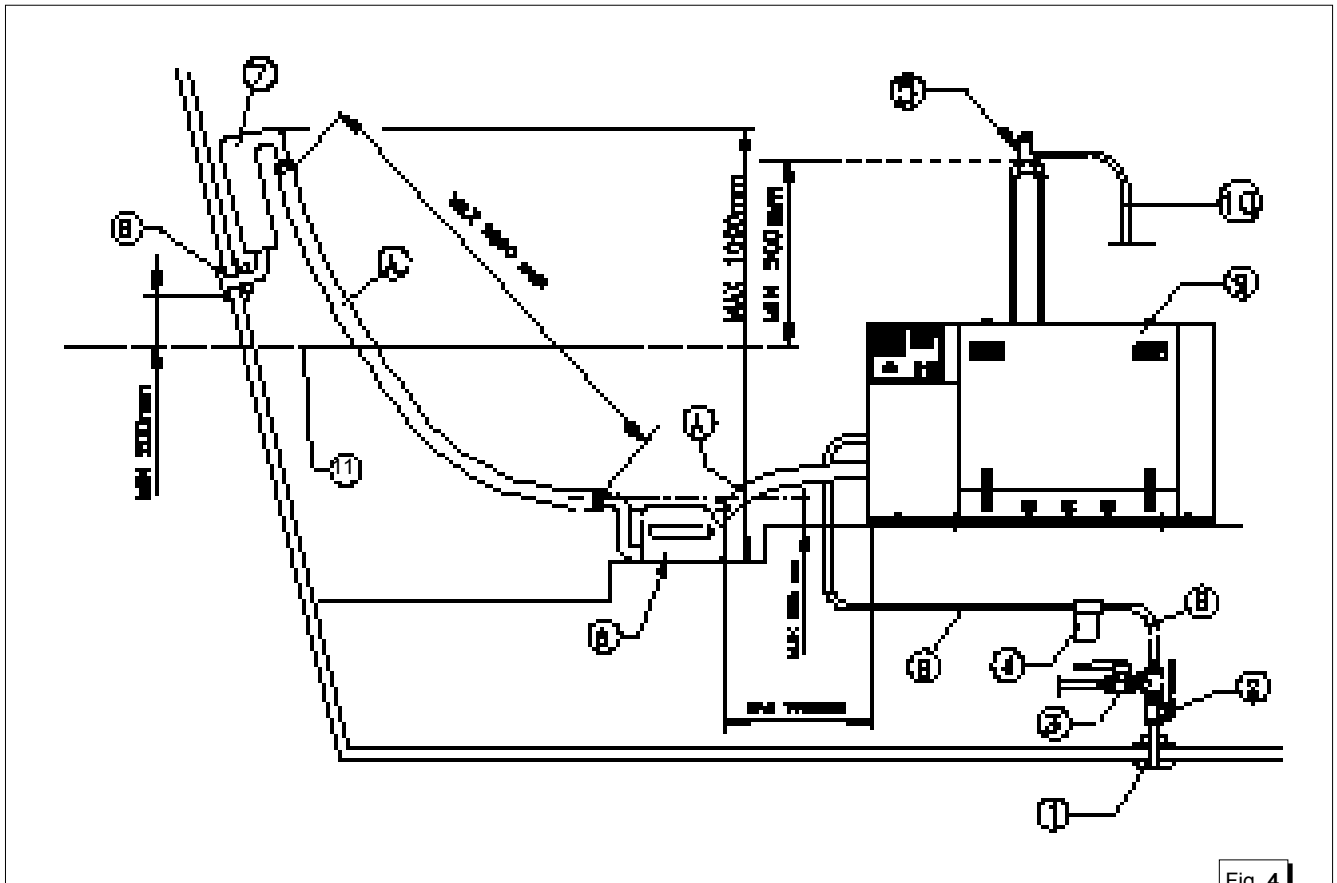


Fig. 4

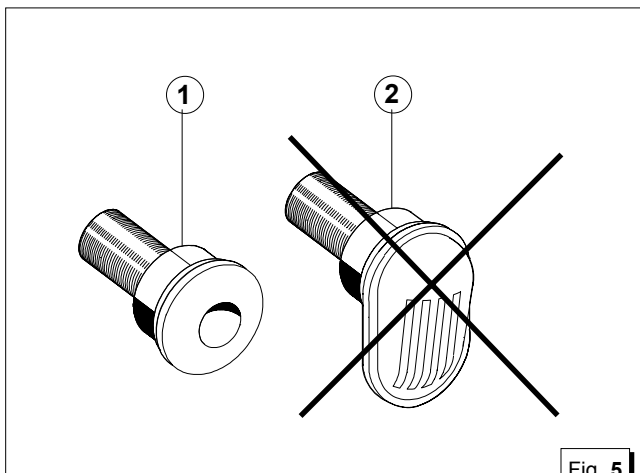


Fig. 5

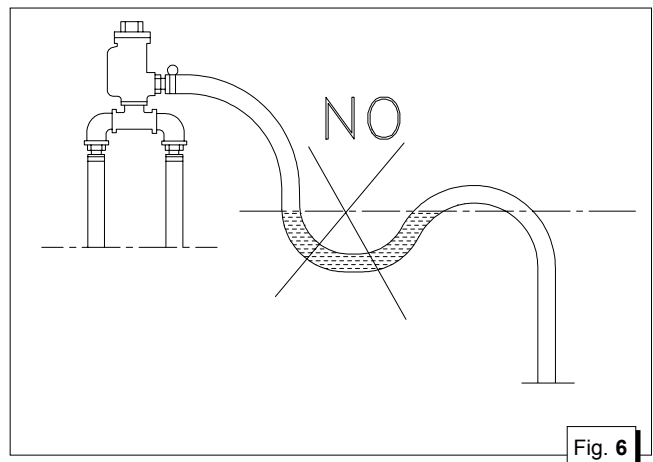


Fig. 6

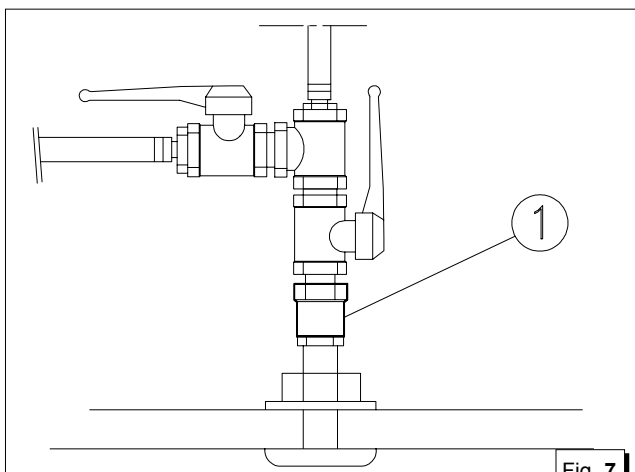


Fig. 7

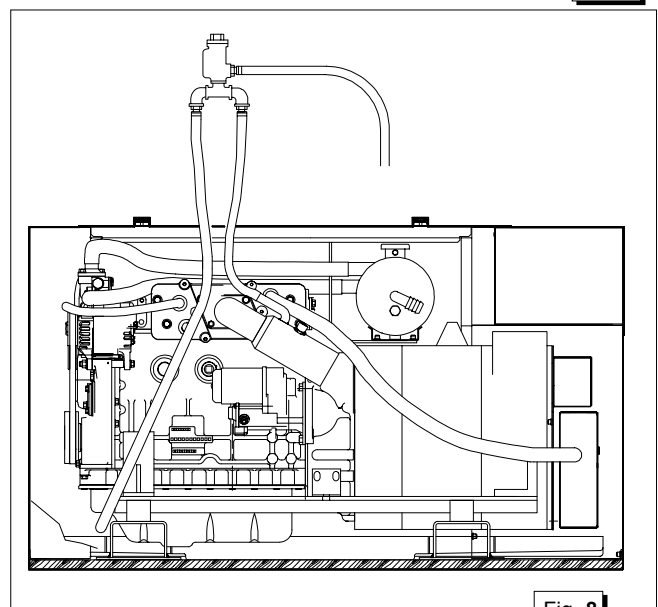


Fig. 8

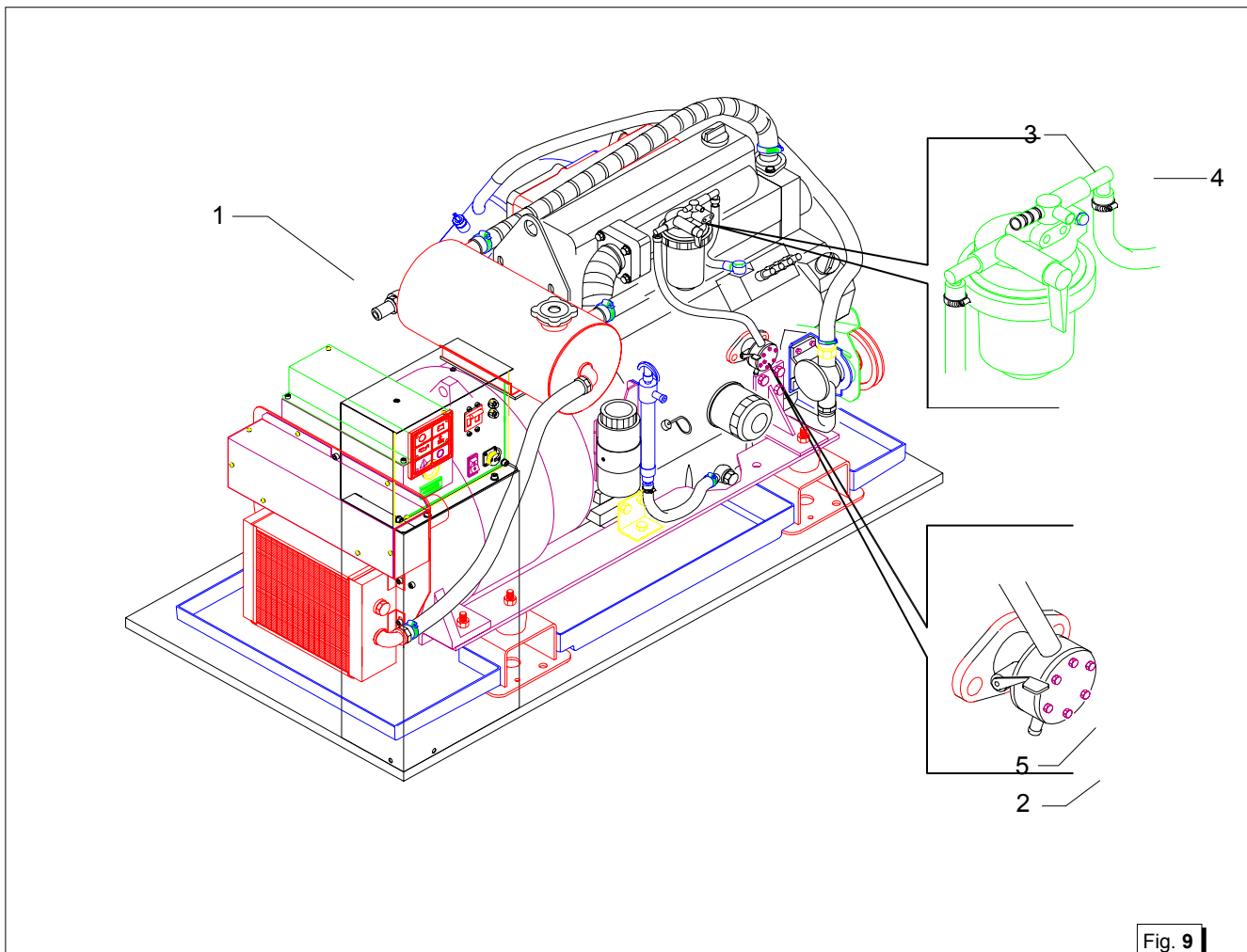


Fig. 9

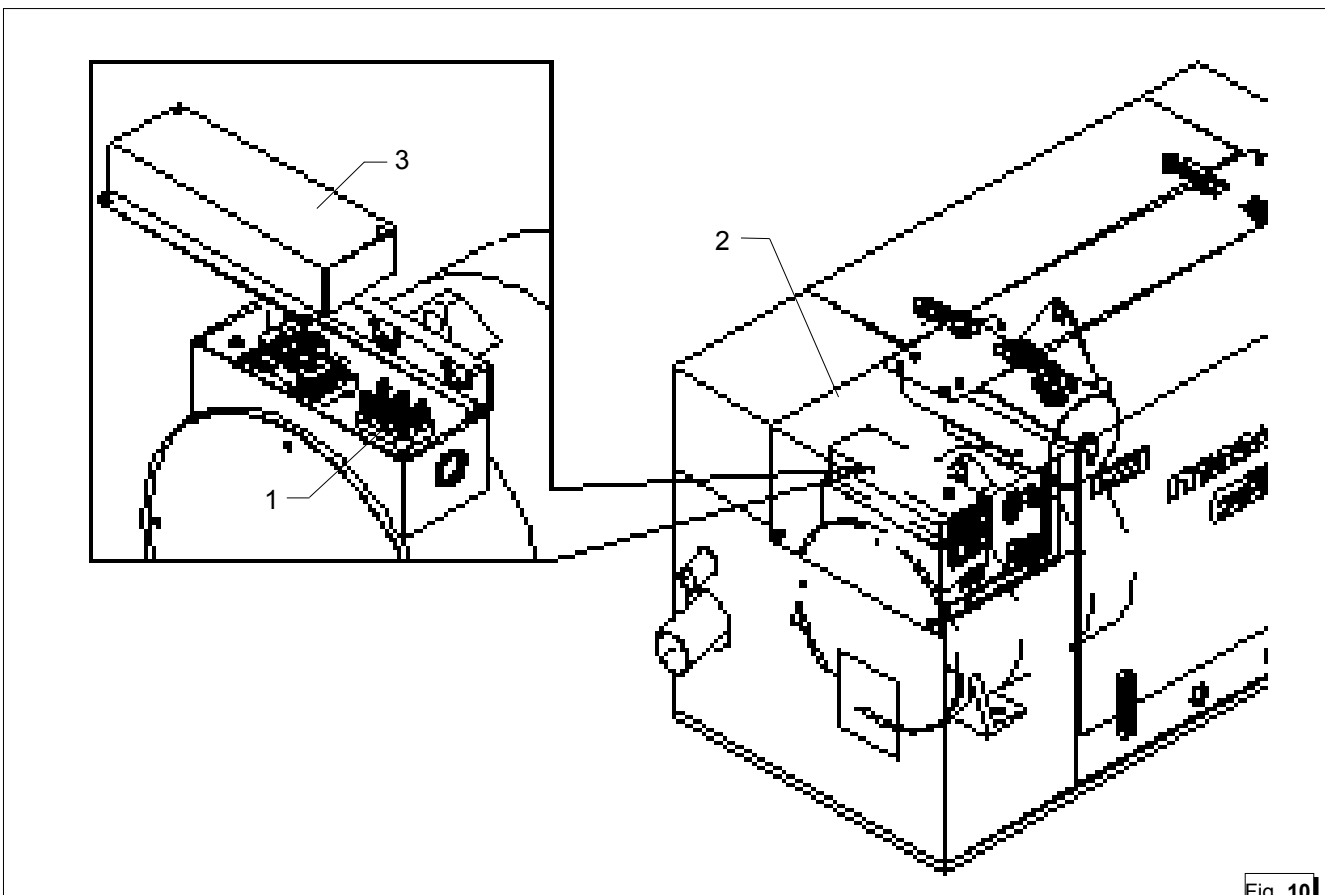


Fig. 10

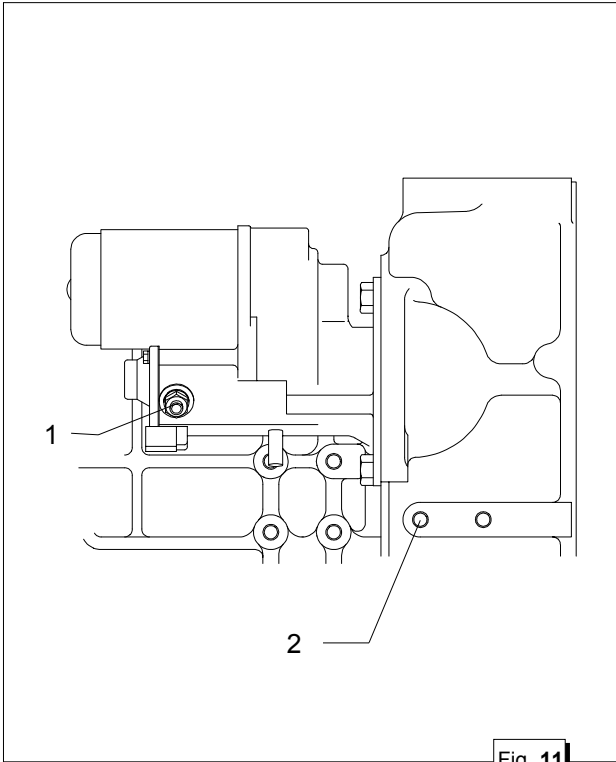


Fig. 11

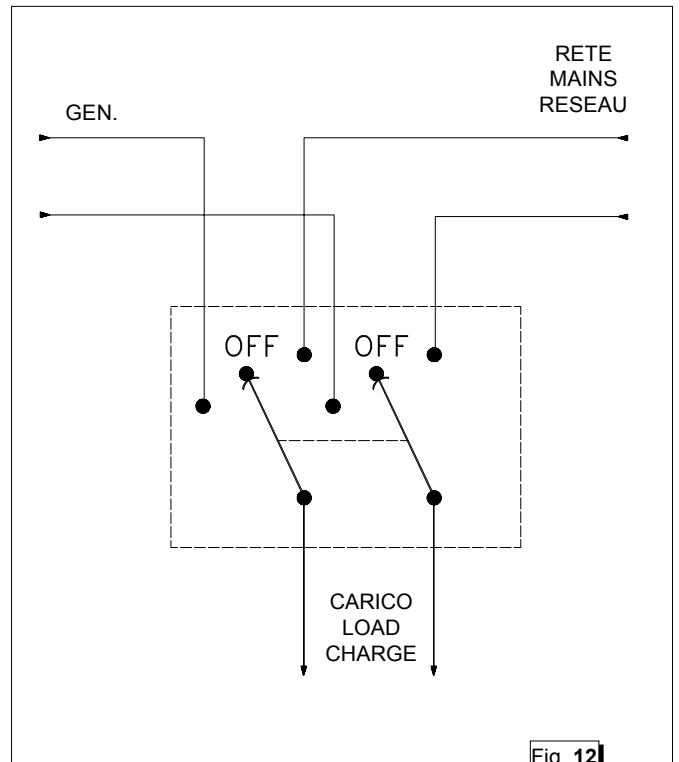


Fig. 12

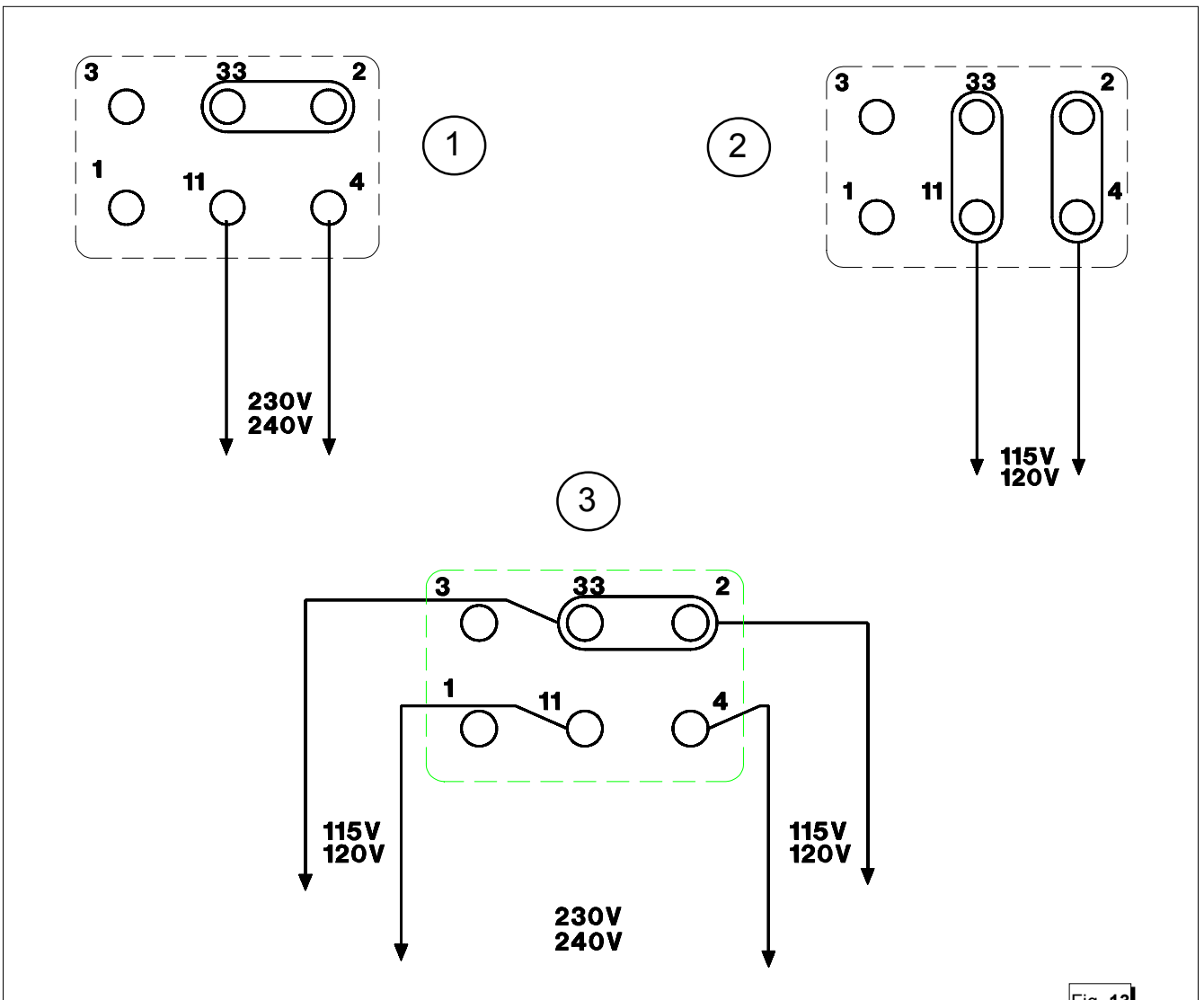


Fig. 13

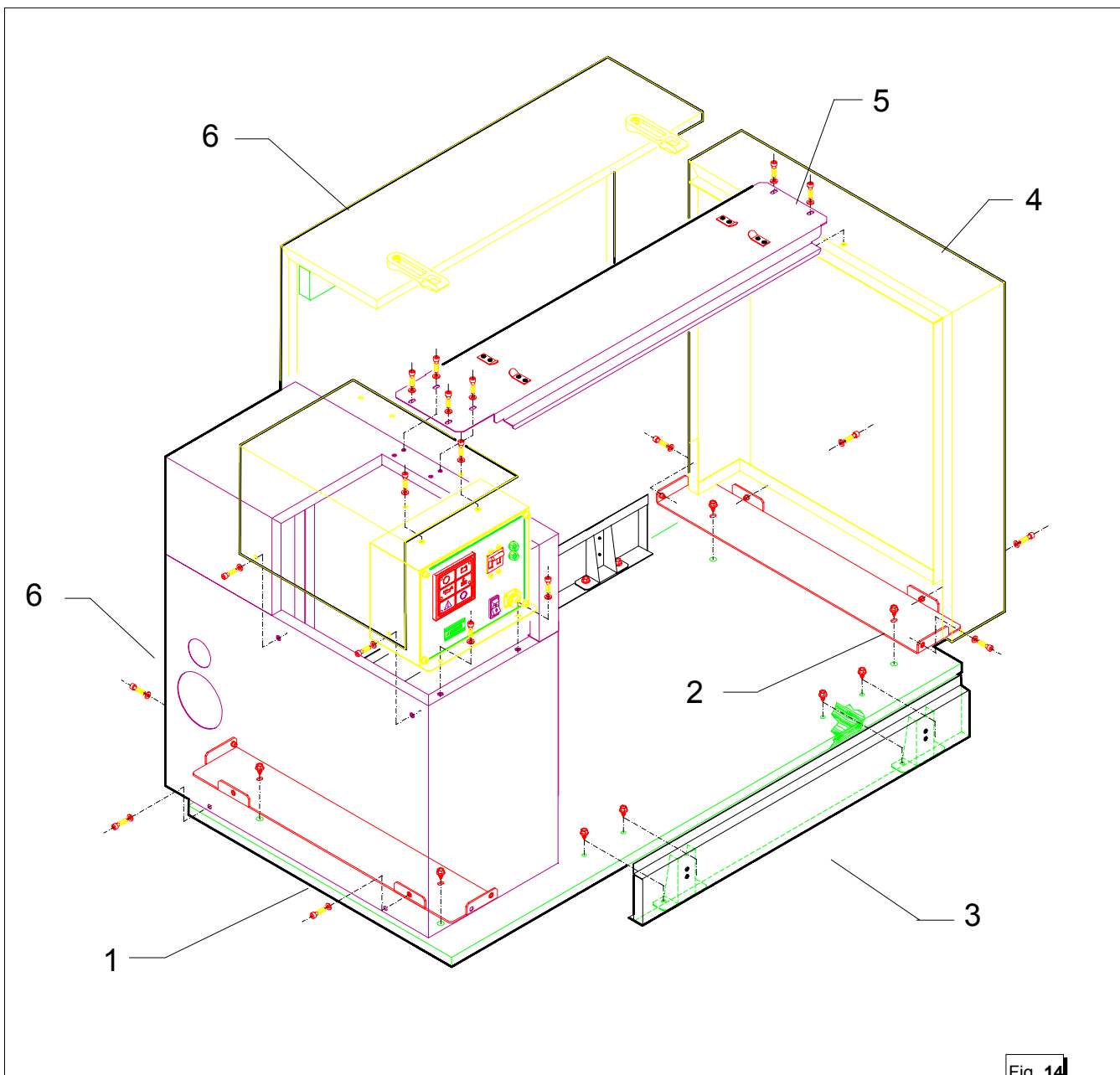


Fig. 14

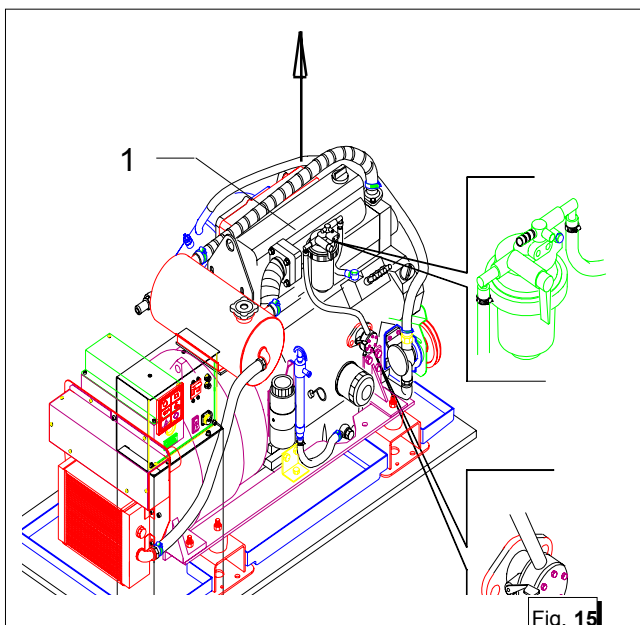


Fig. 15

## CONTENTS

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THE GUARANTEE OF THE PRODUCT BECOMES  
VOID IF THE SPECIFICATIONS CONTAINED IN  
THE FOLLOWING INSTALLATION MANUAL ARE  
NOT RESPECTED


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 **DANGER** A statement advising of the need to take care lest there be serious consequences resulting in death of personnel or in hazard to health.

 **WARNING** A situation that could occur during the lifetime of a product, system or plant that has the potential for human injury, damage to property, damage to the environment, or economic loss.

 **CAUTION** A statement advising of the need to take care lest serious consequences result in harm to material items such as the asset or the product.

 **INFORMATION** Important information.

Drawing are provided by way of example. Should your machine be quite different from the illustrations contained in this manual, the safety regulations and relevant information are always granted.

The manufacturer's policy of constant development and updating may lead to modifications without prior notice.

**1 INSTALLATION**

**1.1 Room features**

The generator must be installed in a well-ventilated room able to ensure the small amount of air required for motor combustion. This room must be separate and acoustically isolated from living areas.

Position the generator so as to provide access for routine maintenance jobs.

It is best to install the generator in the engine room as long as this conforms to the above specifications.

Ambient temperature does not affect generator operation because the air intake to the motor and alternator fan is previously cooled through a heat exchanger.

**1.2 Securing the unit**

To position the generator, provide a base able to withstand its weight. Drill the base in compliance with the overall dimensions (see fig. 1) shown in the following tables:

| GENERATOR                                   |          | IS 11 - IS 13.5   |
|---|----------|---|
| Overall dimensions (H - W - L)              | mm (inc) | 730 - 650 - 1135<br>28.74 - 25.6 - 44.68                  |
| Drilling height (A - B - C - D - E - F - G) | mm (inc) | 277-652-206-86-13-508-56<br>10.9-25.67-8.1-3.4-0.5-20-2.2 |
| Weight (with soundproof casing)             | Kg       | 344   |
| Weight (without soundproof casing)          | Kg       | 315   |

| GENERATORS                                  |          | IS 15 - IS 18.5   |
|---|----------|---|
| Overall dimensions (H - W - L)              | mm (inc) | 730 - 650 - 1260<br>28.74 - 25.6 - 44.7                     |
| Drilling height (A - B - C - D - E - F - G) | mm (inc) | 312-746-202-86-13-508-56<br>12.28-29.37-7.95-3.4-0.5-20-2.2 |
| Weight (with soundproof casing)             | Kg       | 410   |
| Weight (without soundproof casing)          | Kg       | 380   |

| GENERATOR                                   |          | IS 21 - IS 23  |
|---|----------|--|
| Overall dimensions (H - W - L)              | mm (inc) | 800 - 670 - 1340<br>31.5 - 26.38 - 52.76                 |
| Drilling height (A - B - C - D - E - F - G) | mm (inc) | 202-916-222-81-14-508-81<br>7.97-36-8.77-3.2-3.55-20-3.2 |
| Weight (With soundproof casing)             | Kg       | 512  |
| Weight (Without soundproof casing)          | Kg       | 480  |

**1.3 Ventilation**

The generator features an internal closed-circuit ventilation system which, by means of a sea water-air exchanger, cools the alternator and the air inside the soundproof casing. This ventilation system does not require air intake from the external environment.

The amount of air required for combustion passes through four holes on the exhaust side (fig. 2 ref.1). Make sure these holes are always free.

**2 COOLING WATER CIRCUIT**

The generator motor is cooled by the closed-circuit circulation of liquid with liquid-sea water heat exchanger.

When installing, a sea water conduction circuit will have to be set up for cooling as well as an exhaust/drainage system for conveying combustion gases and cooling water outside.

**2.1 Sea water conduction system**

Two water inlet systems are normally adopted on boats (fig. 5)

- 1 - Direct intake system
- 2 - System with deflector

MASE recommends the direct intake system ref. 1 fig. 5 as this system prevents the entry of water under pressure into the intake pipes when the boat is moving and generates a vacuum which is easily overcome by the head of the generator water pump.

**INFORMATION** Do not fit any type of protection hood to the direct intake system.

The sea water intake system with deflector can on the other hand cause the following problems:

- a - **Fitted with slots turned towards the prow**  
In this case, during sailing and with the generator off, a pressure is created in the water intake pipe which can cause the system to fill up until the motor exhaust valves are reached, thereby making it possible for water to enter the cylinders.
- b - **Fitted with slots turned towards the stern**  
In this case, during sailing, a vacuum can be created inside the water intake pipe such as to prevent the pump sucking up sea water or restricting flow with consequent overheating of the generator.

**INFORMATION** During testing of generator installation, it is always advisable to make sure, when the boat is sailing, that there is no pressure in the cooling circuit such as to cause the water to rise towards the motor.



## 2.2 Standard installation of the generator above the waterline (fig. 3)

- 1 Sea inlet (1")
- 2 Main system stopcock (1")
- 3 System drainage cock
- 4 Water filter
- 5 Generator unit
- 6 Silencer
- 7 Drain trap
- 8 Sea outlet pipe (3")
- 9 Waterline
- A - 80 mm inner diameter pipe
- B - 25 mm inner diameter pipe
- C - Clamps
- D - 80 mm inner diameter pipe

**INFORMATION** It is most important to keep to the measurements shown in fig. 3

**INFORMATION** The silencer (fig.3 ref. 6) receives the water in the drainage pipes, when the generator motor is switched off, and prevents this flowing into the motor through the manifold and drain valve. For this reason, exhaust position and pipe length must always be those shown on the installation diagram.

## 2.3 Standard installation of the generator below the waterline (fig. 4)

- 1 Sea inlet (1")
- 2 Main system stopcock (1")
- 3 System drainage cock
- 4 Water filter
- 5 Anti-drain trap valve
- 6 Silencer
- 7 Muffler
- 8 Sea outlet pipe (3")
- 9 Generator
- 10 Drain pipe
- 11 Waterline
- A - 80 mm inner diameter pipe
- B - 25 mm inner diameter pipe
- C - Clamps
- D - 80 mm inner diameter pipe

**INFORMATION** It is most important to keep to the measurements shown in fig. 4

## 2.4 Components

**INFORMATION** The sea water intake system must be separate from that of the boat engines

- 1 - Direct-type sea intake 1"

**INFORMATION** In the event of the unit being installed over 1 m above the waterline, a non-return valve will have to be fitted after the sea intake (fig. 7

ref. 1) to prevent emptying of the cooling system with the motor off. In the event of emptying, an inspection should be made during generator startup to check the damage to the sea water pump. For the same reason, when starting up the generator, manually fill the valve-pump suction pipe.

- 2 - Ball cock (General system) 1"

3 - Ball cock (System drainage) 1"  
This drains the generator cooling system for general maintenance or long periods of inactivity

4 - Water filter (open to inspection)  
This must successfully protect the cooling circuit from mud, sand and algae.  
Water flow capacity IS 11 15 21 = 40 l/min  
Water flow capacity IS 13.5 18.5 23 = 45 l/min

**INFORMATION** The filter mesh must be fine. We recommend using the 2 - 470 micron pitch type. Different measurements do not offer good filter performance.

5 - Anti-drain trap valve: this valves restores the switched-off motor cooling circuit to atmospheric pressure, avoiding any drain-trapping.

**Use is mandatory when the base of the generator is below the waterline.** It must be positioned at least 30 cm above sea level. (see fig.4)

**INFORMATION** The anti-drain trap valve must be fitted between the sea water pump delivery head and the mixer as shown in fig.8  
The drainpipe of the anti-drain trap valve must necessarily run below the valve thereby stopping water from accumulating in the pipe which must always be empty to allow air to pass through when the generator is switched off (see fig. 6)

Use the holes at the bottom of the soundproof casing to access the inside with the anti-drain trap valve connection pipes (fig.2 ref.4)

It is best to bring the ant-drain trap valve drainpipe into the bilge, as small quantities of water could leak out of this during operation.

The cooling circuit must be connected to the exchanger as shown in fig.9 ref. 1

Use the hole on the side wall of the soundproof casing to access the inside with the sea water suction pipe (fig.2 ref.3)

## 2.5 Exhaust/drainage system

The generator combustion gas/water exhaust/drainage system must be separate from that of the main motors. Connect the 80 mm diameter pipe to the exhaust manifold of the motor and secure carefully with a metal clamp. Use the hole on the side of the soundproof casing to access the inside with the exhaust pipe (fig.2 ref.4)



**INFORMATION** The length of the pipe from the highest point of the exhaust pipe to the silencer must not exceed 2 m. This prevents any water in the exhaust pipe, when the generator is switched off, from flowing into the motor once the silencer is full.

### 1 - Silencer

This curbs the noise of the exhaust and prevents water flowing back to the motor. The silencer is best fitted no further than 1 m from the generator and positioned at the height shown in fig. 3/4

### 2 - Muffler

This further reduces noise. The muffler is best installed no further than 1 m from the sea outlet pipe.

### 3 - Sea outlet pipe

This should be installed so it is always above the waterline in all sailing conditions.

## 3 FUEL CIRCUIT

The motor of the generator unit runs on diesel fuel. Two different pipelines will have to be fitted; one for the fuel supply and the other for the reflow of the excess fuel into the tank. A water/diesel fuel separator filter is best fitted to the fuel supply line, between the tank and the generator, to prevent any water/diesel oil mixture damaging the motor. A non-return valve is best fitted when the tank is at a lower level than the fuel pump (fig. ref.) to prevent the emptying of the fuel system. Use a valve with 50 millibar opening

**INFORMATION** The difference in level between the tank and the generator fuel pump should not exceed 7 cm. In the event of this level being greater, it is best to fit an electric fuel pump near the tank to overcome this level difference.

The fuel pipes must be made of hydrocarbon-resistant rubber and have an internal diameter of 8 mm.

### 3.1 Connections

The fuel supply pipe must be connected to the suction union of the AC pump of the motor (fig. 9 ref.2) and the return pipe must be connected to the union on the fuel filter (fig.9 ref.3). Fit the pipes to the unions using metal clamps so as to prevent air bubbles from entering the supply system or fuel from escaping.

Use the holes on the bottom of the soundproof casing to access the inside with the fuel pipes (fig.2 ref.4)

**INFORMATION** For more details, see the motor manufacturer's user and maintenance manual.

### 3.2 Supply system bleeding

After installing the generator, initial startup could prove difficult and motor operation could be irregular due to air bubbles inside the fuel system. This will therefore have to be bled.

Loosen the screw on the fuel filter as shown in fig.9 ref.4 and subsequently act on the fuel pump lever until fuel without air bubbles comes out. Retighten the screw. If necessary, repeat the operation several times.

## 4 POWER CONNECTIONS

### 4.1 Battery connection

To start up the generator an independent 12 V, 100 Ah battery is required.

**INFORMATION** The battery must not be below the indicated capacity.

The battery must be connected to the generator using leads with a cross section of no less than 25 sq mm up to a distance of 4 m, with leads of cross section of no less than 35 sq mm for greater distances. The operation sequence is as follows:

- Connect the positive pole (+) of the battery to the terminal on the starting motor (fig.11 ref.1)
- Next connect the negative pole (-) of the battery to the motor casing (fig.11 ref.2).
- Cover the connections with specific mineral grease to reduce oxidation or corrosion.

The generator features an electronic device for automatic recharging of the starting motor. This produces 15 A at a 12V battery voltage IS 11 - 13.5 - 15 - 18.5 end 40 A. IS 21 - 23.

**WARNING** Install the battery in a well-ventilated environment, separated from the generator and any devices likely to produce heat or sparks. Periodically check the condition of the terminal connections and the level of the electrolyte in the battery. In the event of it being necessary to disconnect the leads, proceed in the reverse sequence to that suggested for connection. Never invert the connection lead poles - the generator and battery could be seriously damaged. Never connect other loads to the battery.

In order to keep galvanic currents down to a minimum, the negative (-) pole of the generator unit must not be connected to the negative (-) pole of other batteries on board.

#### 4.2 A.C. Connection

This connection can be made by means of the power terminals on the alternator of the generator unit (fig. 10 ref. 1). Access to this terminal board can be achieved after removing the closing panel as indicated in fig. 2 ref.2 and cover fig.10 ref.3.

This range of generators can be used at either 115V - 50 Hz / 120 V - 60 Hz or 230V - 50 Hz / 240V - 60 Hz.

Two types of connection (and consequently use) are therefore possible, according to the following configurations:

**1 - In parallel connection:** in this configuration, there is just one 115 (120)V output between points 11 and 4 connecting the alternator outputs (33 - 11 and 2 - 4) as shown in the diagram in fig. 13 ref. 2.

**2 - In series connection:** in this configuration power output can be 230 (240) V between points 11 and 4 as shown in the diagram in fig.13 ref. 1.

In the case of the in-series connection, voltage can be either 115 (120) V between 3 - 1 and 2 - 4 or 230 (240) V between points 11 and 4 as shown in the diagram in fig. 13 ref. 3.

**! INFORMATION** If the in-series connection is selected (Fig. 13 ref. 3) with 115 V 50 Hz - 120 V 60 Hz voltage, current should not exceed 50% rated.

- To achieve both in-parallel and in-series connections use jumpers on terminal board fig. 10 ref. 1

- Make sure that the sum of the loads to be supplied is not greater than the rated power of the generator.

- The generator features an overload cutout which interrupts power supply in case of overloads or short-circuits.

#### 4.3 Generator - mains switch

A switch must be fitted to the line so that utilities can be switched from the generator to a mains power supply. This switch must be sized according to the loads involved: a standard diagram is shown in fig.12.

## 5 HANDLING

### 5.1 Lifting

To handle and lift the generator unit, use only the specially set lifting hook provided (fig. 15 ref. 1)

**! DANGER** Hooking the generator unit to points other than those indicated could damage the unit itself and be dangerous for operators.

## 6 SOUNDPROOF CASING ASSEMBLY

The generator units of the IS 1500 rpm series can be used with or without the soundproof casing. Configuration without the soundproof casing features a wood base and dashboard support as represented in fig.9

Should you wish to further soundproof the generator unit, a specially designed soundproof cabin is available for the purpose.

To install the soundproof cabin, proceed as follows:

- secure the clamping brackets (fig.14 ref. 1-2) and two sides to the wood base using the screws provided, as indicated in fig.14 ref. 3.

- Secure the two end sides to the wood base as indicated in fig.14 ref. 4-6.

- Secure the upper crosspiece to the two end sides, fig.14 ref.5.

- Secure the two doors by means of the rubber straps provided fig. 14 ref.6.