



## INSTALLATION MANUAL

# M-SQ 27 kVA / 25 kW

1500 RPM marine diesel generating set

Three-phase 230/400V 50Hz



Art.nr. 40200456

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# CONTENTS

<b>1</b>	<b>INSTALLATION.....</b>	<b>3</b>
1.1	General .....	3
1.2	Location.....	3
1.3	Instructions for optimum sound and vibration insulation .....	3
1.3.1	Further recommendations .....	3
1.4	Ventilation .....	4
1.4.1	General .....	4
1.5	Connections .....	4
1.5.1	Fuel supply .....	4
1.5.2	Cooling .....	6
1.5.3	Exhaust system .....	7
1.5.4	Electrical installation (12 Volt) .....	10
1.5.5	AC power system (230 / 400 Volt).....	12
<b>2</b>	<b>INSTALLATION SPECIFICATIONS .....</b>	<b>14</b>
2.1	General .....	14
2.2	Commissioning table .....	14
2.3	Technical data .....	15
2.4	Specifications of the accessories.....	15
2.5	Installation materials.....	16
<b>3</b>	<b>DIAGRAMS &amp; DRAWINGS.....</b>	<b>22</b>
3.1	General view of connections .....	22
3.2	AC wiring diagram.....	23
3.3	Remote control panel.....	24
3.4	Dimensions and footprint .....	25

# 1 INSTALLATION

## 1.1 GENERAL

This manual applies to the installation of the WhisperPower M-SQ 27 kVA / 25 kW generator set in ships. This manual is valid for the following models:

Part no.	Description
41201305	M-SQ 27 kVA / 25 kW
41201330	M-SQ 27 kVA / 25 kW keel-cooled
41201336	M-SQ 27 kVA / 25 kW keel-cooled, ungrounded

For other models see our website: [www.whisperpower.com](http://www.whisperpower.com).



### WARNING

A warning symbol draws attention to special warnings, instructions or procedures which, if not strictly observed, may result in damage or destruction of equipment, severe personal injury or loss of life.



### DANGER

This danger symbol refers to electric danger and draws attention to special warnings, instructions or procedures which, if not strictly observed, may result in electrical shock which will result in severe personal injury or loss of life.



### WARNING!

Before working (installation) on the system read the safety instructions in the user's manual

To ensure reliability and durability of the equipment, it is very important that the installation is carried out with the utmost care and attention. To avoid problems, such as temperature problems, noise levels, vibration, etc. the instructions set out in this manual must be followed and all installation work must be carried out professionally.

## 1.2 LOCATION

Since WhisperPower generating sets have extremely compact dimensions, they can be installed in tight locations. Please consider that even almost maintenance-free machinery must still remain accessible.

When selecting the location area in which to mount the generating set, make sure there is sufficient room to carry out any maintenance work. The unit must be easily accessible on the service side and on the distribution side to have access to the V-belt.

Please also note that in spite of the automatic oil pressure sensor it is still essential that the oil level is checked regularly.

## 1.3 INSTRUCTIONS FOR OPTIMUM SOUND AND VIBRATION INSULATION

Position the generating set as low as possible in the vehicle. The generating set is already secured to the base frame by means of flexible engine mountings. The base frame is mounted to the chassis of the vehicle on a second set of rubber mountings that is included in the delivery. Use the included mounting template to determine the mounting spots.

When it is possible to mount the unit directly on the chassis of the vehicle this has advantages in preventing vibrations by resonance.

### 1.3.1 Further recommendations

WhisperPower generating sets are standard equipped with a sound cover. This sound cover has been designed to give effective sound insulation. For optimum sound and vibration dampening, the following factors should be considered.

- 1 Most important is the structure on which the generator is placed to be stiff. Directly below the rubber mountings the structure should be supported vertically by the ship's frames.
- 2 Avoid mounting the generating set in close proximity to thin walls or floors that may cause resonance.
- 3 Sound dampening is extremely poor if the generating set is mounted on a light weight flimsy surface such as plywood which will only amplify vibrations. If mounting on a thinner surface cannot be avoided, this should be at least be reinforced with stiffening struts or ribbing. If possible, holes should be drilled or cut through the surface to help reduce the resonance. Covering the surrounding walls and floors with a heavy coating plus foam will certainly improve the situation.
- 4 Never connect the base of the generating set directly to bulkheads or tanks.

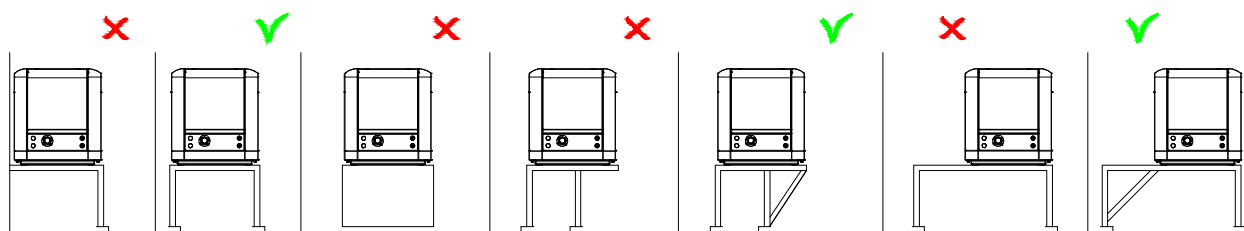


Figure 1: Mounting of the WhisperPower generating set X = wrong, V = OK

## 1.4 VENTILATION

### 1.4.1 General

The generating set normally draws air from the engine room. Engine rooms with natural ventilation must have vent openings of adequate size and location to enable the generating set to operate without overheating. To allow an ample supply of air within the temperature limits of the generating set an opening of at least a half square meter (0,5 m<sup>2</sup>) is required.

A "sealed" engine compartment must have a good extraction ventilator to maintain reasonable temperatures. High temperature of intake air reduces engine performance and increases engine coolant temperatures. Air temperatures above 40°C reduce the engine power by 2% for each 5°C of rise. To minimize these effects the engine room temperature must not be more than 15°C above the outside ambient air temperature.

Apply a combination of ventilators, blowers and air intake ducting to meet the temperature limit. The air inlet ducts should run to the bottom of the engine room to clear fumes from the bilge and to circulate fresh air. Air outlets should be at the top of the engine room to remove the hottest air. An engine room blower should be used as an extraction ventilator to remove air from the engine room.

In cases where it is impossible to meet the above mentioned temperature limit by using engine room ventilation, connections are to be made for an air inlet directly to the generator enclosure. With these connections the generating set can be directly connected to an air duct.

Air inlets should be louvered, where appropriate, to protect the engine room and to protect the generating set from water spray. As an extra precaution, the fitting of a cowl ventilator with a cover box located as high as possible, is recommended.

## 1.5 CONNECTIONS

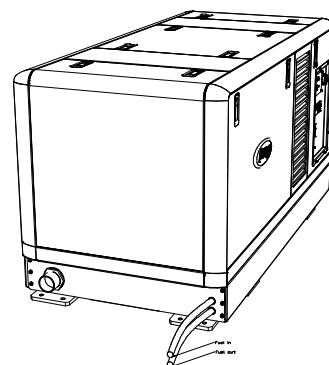
The generating set comes with all supply lines and output cables (i.e. electric cables, cooling water connections, exhaust, fuel lines etc.) already connected to the engine and generator. The supply lines are fed through the capsule's base. The connections are marked as shown in Figures 2 and 3.

All electrical connections, cable types and sizes must comply with the appropriate national regulations. Supplied cables are rated for ambient temperatures up to 70°C. If the cables are required to meet higher temperature requirements, they must be run through conduits.



### ATTENTION!

Before working (installation) on the system read the safety instructions.



From left to right:

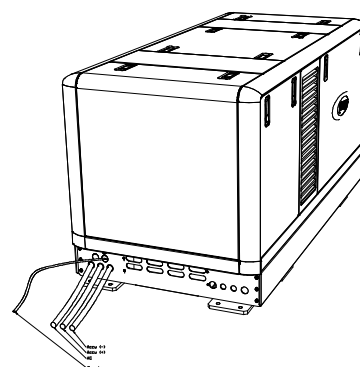
Exhaust connection 2"

Cooling water inlet Ø35mm

Fuel out Ø8mm

Fuel in Ø8mm

Figure 2: Non-electrical connections



From left to right:

Remote control panel

Alternating current

Battery positive (+) 35mm<sup>2</sup>

Battery negative (-) 35mm<sup>2</sup>

Figure 3: Electrical connections

### 1.5.1 Fuel supply

#### 1.5.1.1 Fuel tank

Fuel tanks should be made of appropriate material such as (stainless) steel or plastic. Steel tanks should not be galvanized or painted inside. Condensation can occur in metal tanks when temperature changes. Therefore, water accumulates at the bottom of the tank and provisions should be made for the drainage of this water.

The tank will need a filling connection, a return connection and an air ventilation connection which will require protection against water entry.

Some official regulations do not allow connection points at the base of the fuel tank. In this situation, connections are to be made at the top of the tank with internal tubing down to a few centimeters above the bottom of the tank.

### 1.5.1.2 Fuel lift pump

The generating set itself is equipped with a fuel lift pump; therefore the tank can be installed at a lower level than the generating set. The maximum suction height is 1 m.

If the pump has to lift the fuel higher than one meter an external fuel lift pump must be installed (Art. No. 50201062). The control board is already prepared to connect an extra fuel pump.

### 1.5.1.3 Fuel pipes

When the tank is above the generating set (Figure 4) we recommend ending the return line on the top of the tank.

When the return is on the top - in case of a leakage the return line cannot overflow because of siphoning. One will only need a fuel cock in the fuel supply line. When the tank is below the

generating set we recommend ending the return line on the bottom of the tank (A) below the inlet of the supply line.

Both supply and return fuel pipe lines should be appropriate material and 8 mm outer diameter tubing. The quality of the tubing of fuel pipes could be submitted to local regulations depending on the application of the vehicle.

The fuel pipes can be plumbed to the flexible hoses which are on the generating set and have a connection to fit to 8 mm pipe. These fuel lines fulfil CE standards and are according to ISO 7840 A2.

It is important to avoid bends in the pipes, as they could trap air bubbles. The return pipe should never be connected to the suction pipe.

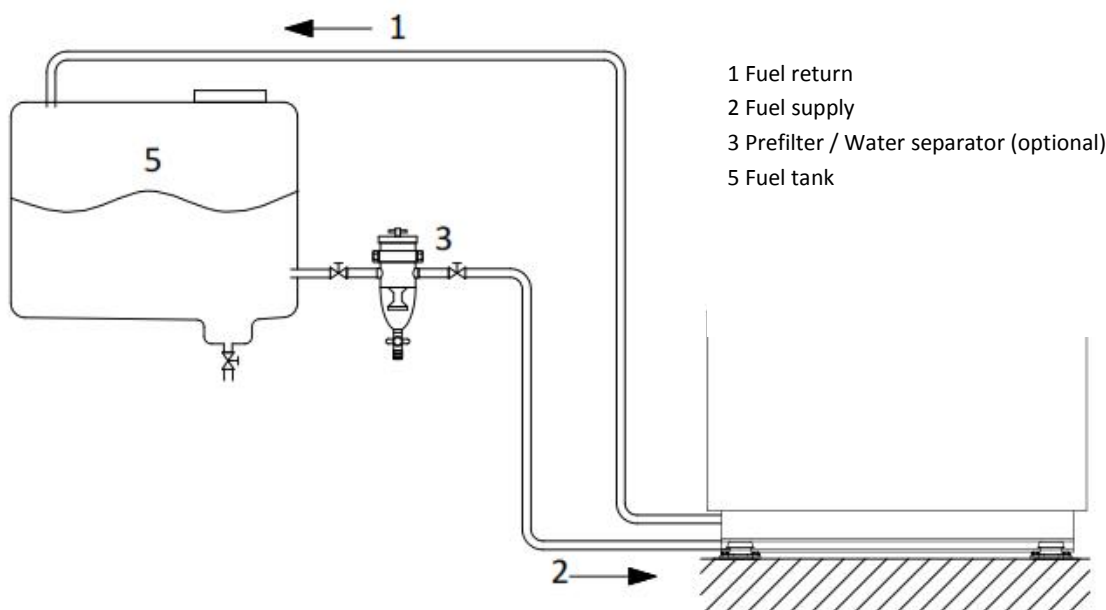


Figure 4: Fuel supply (fuel tank is above the generating set)

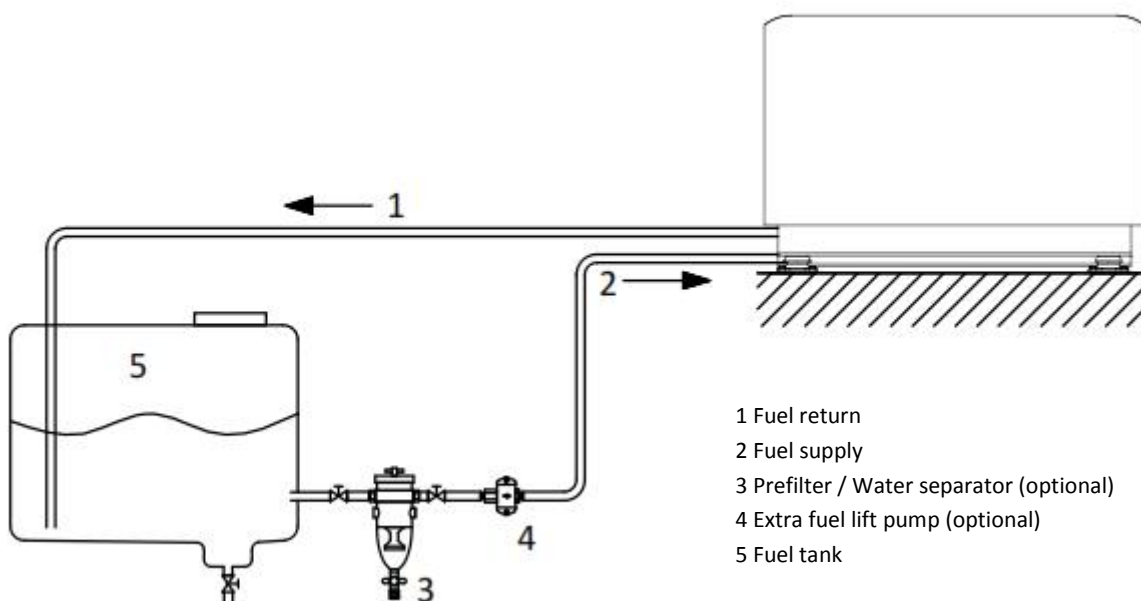


Figure 5: Fuel supply (fuel tank is below the generating set)

#### 1.5.1.4 Fuel filters

A fine fuel filter is installed which requires maintenance. WhisperPower advises to install an extra fuel filter/ water fuel separator near the fuel tank.

Before starting your generating set for the first time follow the fuel system bleeding procedure in the user's manual.

### 1.5.2 Cooling

#### 1.5.2.1 General

Intercooling is based on a raw water pump, heat exchanger and water-injected exhaust. Cooling liquid in the internal cooling system is cooled in a heat exchanger by outboard water (raw water or seawater). After the raw water is warmed up in the heat exchanger it is dumped overboard by injecting it in the exhaust.

The generating set should have its own sea water (coolant water) inlet and should not be connected to any other engine systems. A properly installed cooling system is critical to keep engine temperatures within an acceptable range. Ensure that the installation complies with the following installation instructions.

#### 1.5.2.2 The internal cooling system

The internal cooling system should be filled with cooling liquid. (Refer to the user's manual 2.5.12) When the engine becomes hot the liquid expands and the system is pressurized. After the pressure becomes too high the release valve in the filling cap on the manifold opens and the expanding liquid is pressed into the expansion tank that is in the delivery. Also the air in the system that is collected at the top of the manifold is released in this way. When the liquid cools down there will be under-pressure. Another valve opens and the liquid is sucked into the

manifold again. This system works only when there is enough liquid initially. This has to be checked when commissioning the generator set. By filling up the expansion tank when necessary there will always be enough liquid in the system. The hose that is in the delivery has to be connected to the connection on the side of the filling cap. This hose is made of heat resistant plastic and is not sensitive for kinks.

The hose goes through a hole in the canopy.

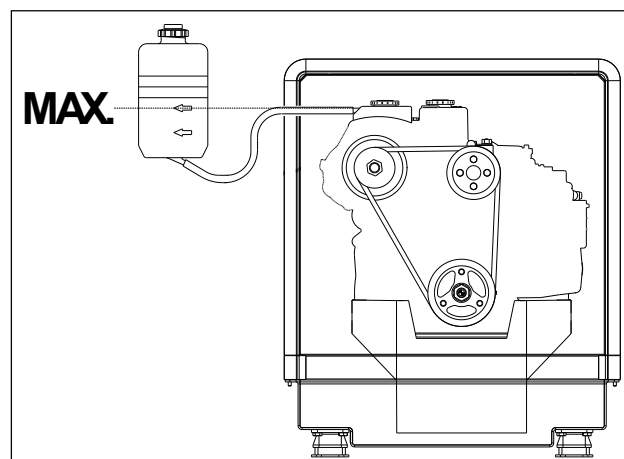


Figure 6: Expansion tank placement

The tank has to be placed close to the generator. When it is mounted above the top of the manifold the liquid in the tank will be drained when the cap on the manifold is taken off. When keel cooling or radiator cooling is applied the system will not be pressurized. A cap without release valve should be applied. Refer to the special manual for these applications.

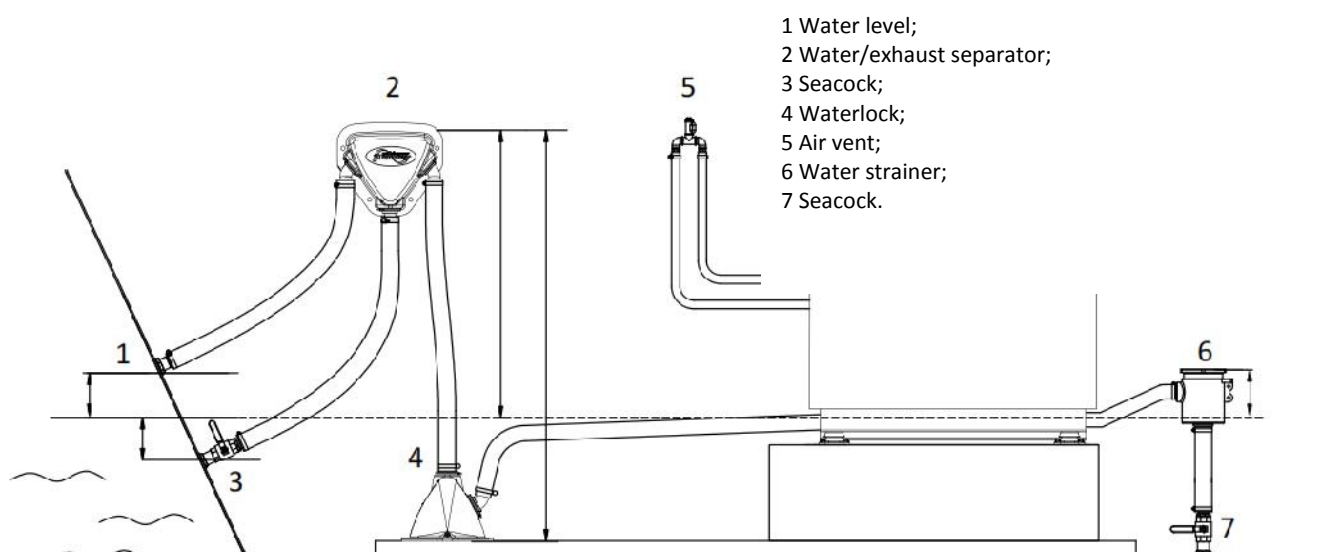


Figure 7: Internal cooling system

### 1.5.2.3 Raw water supply

For raw water supply the following installation materials are required: -a skin fitting - a sea cock - a water strainer - hoses and clamps. In order to keep the suction resistance in the line at a minimum, the sea water intake system (i.e. sea cock, trough-hull fitting, inlet filter, etc.) must have an inner diameter of at least 25.4 mm diameter (1"). The suction hose should be kept as short as possible. Raw water plumbing should avoid bends as much as possible.

Restriction of raw water flow, caused by kinked hoses, undersized pipes or connections, will reduce the engine cooling capability. This is the main cause for overheating of an engine.

After running the generating set for the first time, check the coolant flow rate using a stopwatch and by holding a pail of a known volume under the wet-exhaust outlet. The flow rate should be according to the data in the user's manual.

### 1.5.2.4 Through-hull fitting

It is good practice for yachts to use a hull inlet fitting with an integrated strainer (water scoop). For propulsion engines in motorboats the water scoop is often mounted against the sailing direction to induce more water intake for cooling.



This should not be done in the case of a generating set! When sailing at higher speeds, water will be forced into the inlet and your generating set will overflow! (see Figure 8).

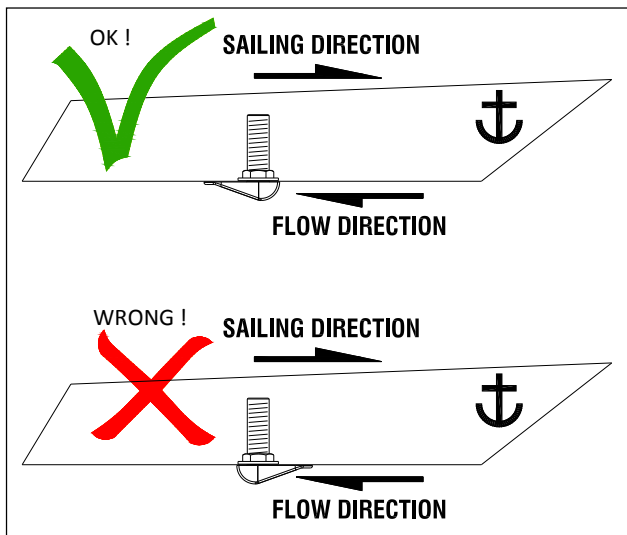


Figure 8: Installing water intake

On motorboats and on sailing boats the water scoop for a generating set should be fitted with the opening faced backwards to prevent water being forced in during sailing.

### 1.5.2.5 Water strainer

Use an appropriate water strainer with connections of 25.4 mm (1"). Install the water strainer in a well accessible position, 5 cm above the waterline (see Figure 7, ref. 6).

### 1.5.2.6 Siphon breaker (air vent)

When the point of water injection is below the waterline, then - when the engine is stopped -there is a risk that the cooling water may enter the engine as a result of siphoning. To avoid this, the generating set is designed to accommodate a siphon breaker (air vent). In the standard delivery the connections are bypassed. Hose of 25.4 mm (1") inner diameter should be used.

If the generating set cannot be mounted such that the bottom of the set is above the waterline, an air vent must be installed. Extend the water hose of the by-pass 60 cm above waterline and install an air vent. Ideally, the air vent should be mounted above the yacht keel center line (i.e. to minimize the influence of swaying on the water intake).

Fast motorboats will lay deeper when sailing at large speed (non-planing) and have additional pressure on the water inlet. This should be avoided to prevent water from entering into the engine.



If the air vent is clogged the water hoses will not be vented when the generating set has stopped and water can be forced into the engine. This leads to immediate engine problems and eventually severe damage!

**DAMAGE CAUSED BY THE INGRESS OF WATER IN THE ENGINE IS NOT COVERED BY GUARANTEE.**

Check the air vent at regular intervals. Open, clean and lubricate the valve as required.

### 1.5.3 Exhaust system

#### 1.5.3.1 General

Water is injected in the exhaust system of the generating set. In this way the cooling water that has passed the heat exchanger is mixed with the exhaust gases. Temperature and volume of the gases are thereby reduced considerably, so that a rubber exhaust hose can be used and the level of noise is reduced as well.

#### 1.5.3.2 Standard exhaust system

The generating set exhaust system must remain completely independent and separate from the exhaust system of any other engine on board. A water lock prevents the generating set from being flooded by cooling water and should be installed as close to the generating set as possible. The lock must be large enough to hold the entire water volume held in the hose from the top of the goose neck to the water lock. The water lock must be installed at the lowest point of the exhaust system (see Figure 11, ref. 1). The exhaust hose must have an inner diameter of 63 mm (2½"). The exhaust system must be installed so that the back pressure inside the exhaust does not exceed 0.07 bar (1psi – 70 cm water column) and total length from the generator to the top of the goose neck or water/separator does



not exceed 3m (10 ft.). (Refer to paragraph 5.4.3 of the user's manual).

The exhaust hose descends from the capsule to the water lock. Then the hose rises via the "goose neck" to the through-hull exhaust outlet, situated minimum 50 mm above the water line (Figure 11, ref 5.) The "goose neck" must be vertical and

situated preferable along the ship's keel center line. If the generating set is mounted less than 600 mm (24") above the waterline, a "goose neck" must be installed to prevent the engine from overflowing. It is recommended to install an extra muffler close to the through-hull fitting.

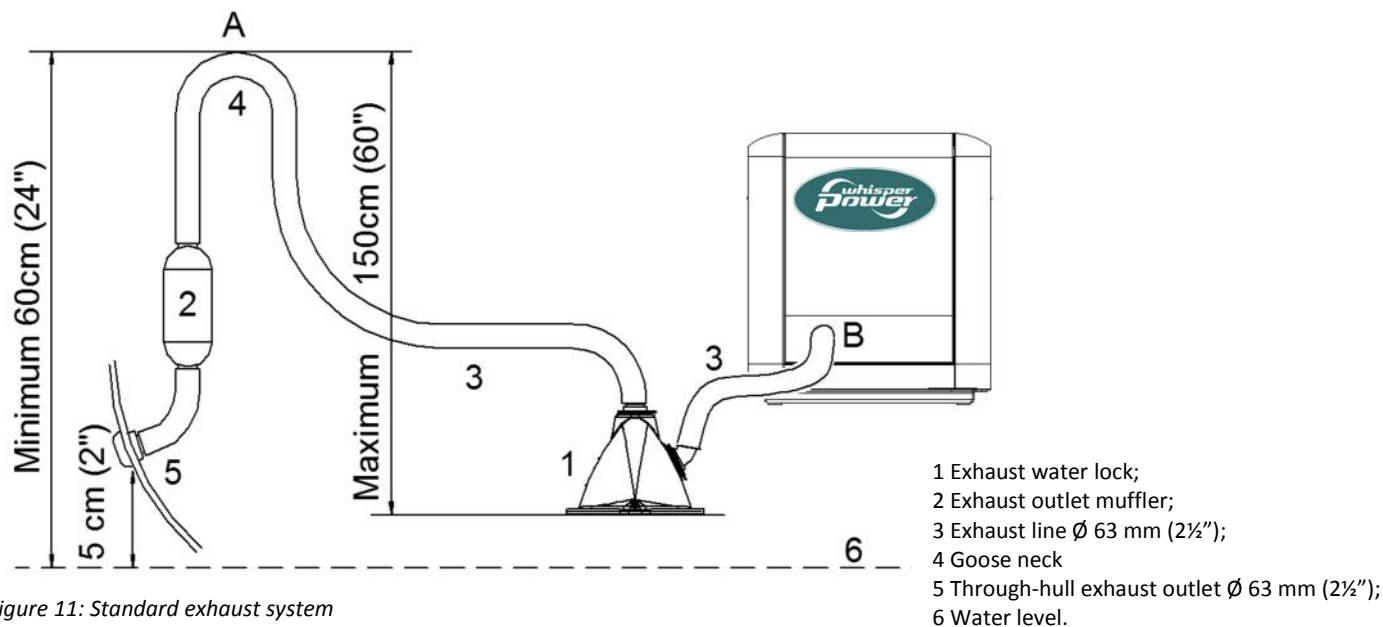


Figure 11: Standard exhaust system



### 1.5.3.3 Super silent exhaust system

In order to reduce the noise level of the generating set to a minimum, an option to reduce the exhaust noise further (especially exhaust water splashing) is an exhaust/water separator. The exhaust/water separator allows the cooling water to be ejected through a line (Figure 12, ref. A) separate from the exhaust fumes and also functions as a goose neck to prevent water from flooding the engine. If the exhaust/water separator is mounted more than 60 cm above the water level an additional goose neck is not required.

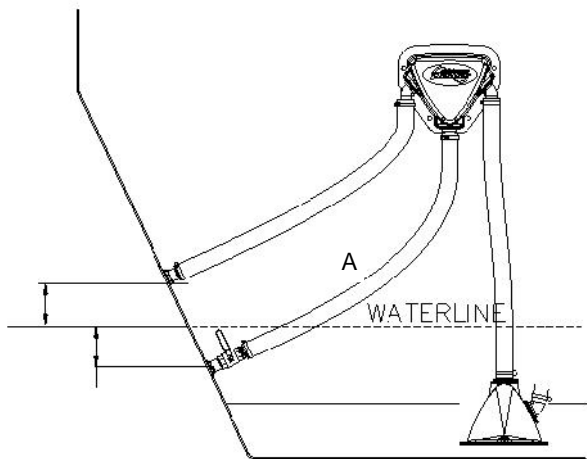


Figure 12: Super silent exhaust system

If the through-hull exhaust outlet has to be mounted far from the generating set an exhaust/water separator must definitely be installed. When the length of the exhaust piping from the generator to the top of the goose neck (water separator) exceeds 3 m; see Figure 13. The sea water from the separator must then run down along the shortest possible path to the through-hull outlet. Only after the exhaust/water separator the exhaust hose may have a length of over 7,5 m (Figure 13).

However, water traps should be avoided as the fumes still contain water and this should not accumulate in bends (see Figure 14). An additional outlet exhaust muffler close to the hull outlet will help further to reduce noise emission (Figure 11, ref 2).

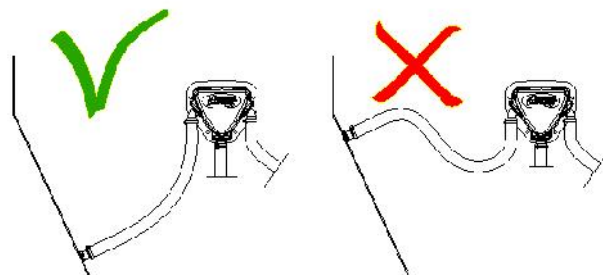


Figure 14: Water trap in exhaust system

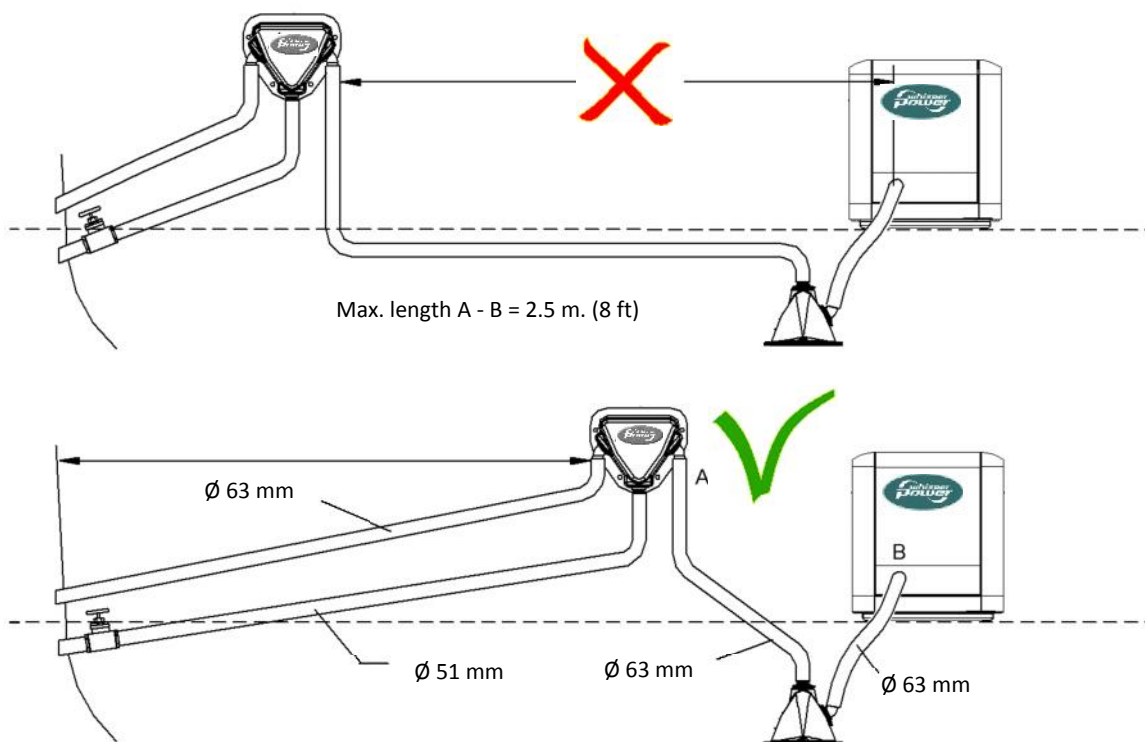


Figure 13: Hose lengths

If the generating set and the exhaust system have been installed correctly, neighboring boats will not be disturbed by generating set noise. With the "super silent" exhaust system, generating sets are almost inaudible. For optimal noise reduction, the sea water outlet from the exhaust/water separator (center outlet on the unit, see Figure 12) should be installed below the water level to eliminate noisy splashing of the effluent sea water.

The through-hull outlet for the exhaust fumes should not direct the fumes directly toward the water surface as this will cause excessive noise (see Figure 15).



Do not direct the outlet directly toward the water surface.

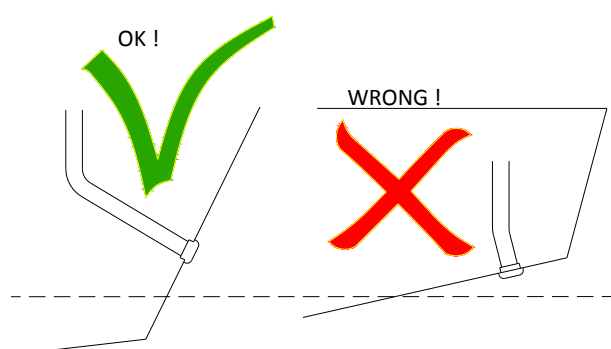


Figure 15: Outlet direction

## 1.5.4 Electrical installation (12 Volt)

### 1.5.4.1 Digital diesel control system

The electrical control system is standard in 12 Volt with negative earth. Non-earth return is available as an option for aluminum vessels to prevent corrosion.

All electrical wiring has been prepared on the generating set to the control panel prior to dispatch from the factory. The engine is controlled by a very advanced microprocessor based system: Digital Diesel Control. The "black box" containing the microprocessor is located on top of the alternator. A local control panel is on the generating set.

### Remote control

A remote control panel also containing a microprocessor is in the delivery. A 15 m 8-pole communication cable is in the standard supply (refer to Figure 16). If necessary an optional longer (up to 30m / 100ft) cable can be connected if the standard length does not suit the required distance. When a longer distance than 30m / 100ft is required, consult the WhisperPower service department for advice.

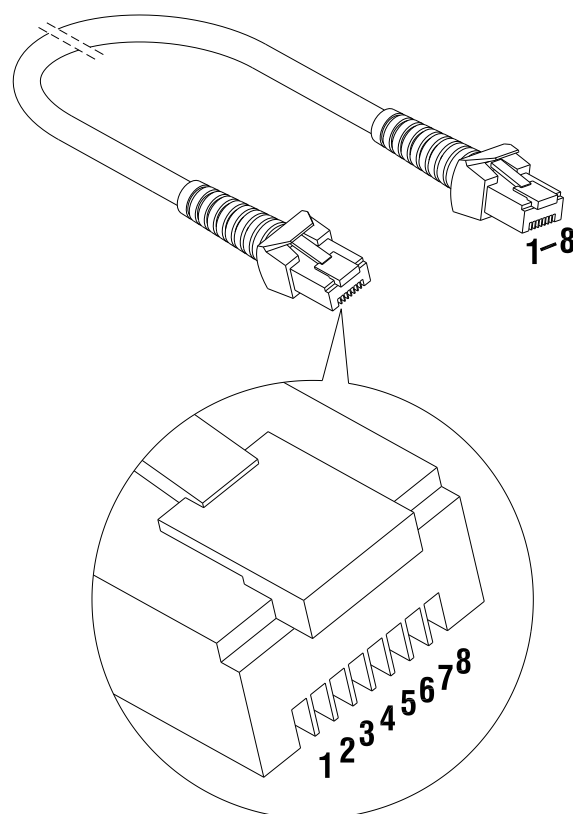


Figure 16: Remote control cable

One can mount the control panel after drilling a hole in the dashboard using the plastic cover. Refer to the dimensional drawings in 3.5.

Multiple remote control panels (slave panels) can be put in parallel by using the modular connectors on the back of the units. As a slave one can use the same panel offering all functions again. It is also possible to use an old or new type slave panel only to start and stop the generator.

Old type remote panels and system panels can be connected by means of the green connector.

Pay attention to the color codes as indicated in Figure 17 when fitting cable to the green connector. Some software versions in old system panels (supplied before May 2004) could conflict with the software in the DDC and an update of the software of the system panel could be necessary. When this is the case consult to the WhisperPower service department for advice.

When using the factory settings, installation is very simple: just plug the remote cable into the remote and the generator is ready to use. Refer to Figure 17.

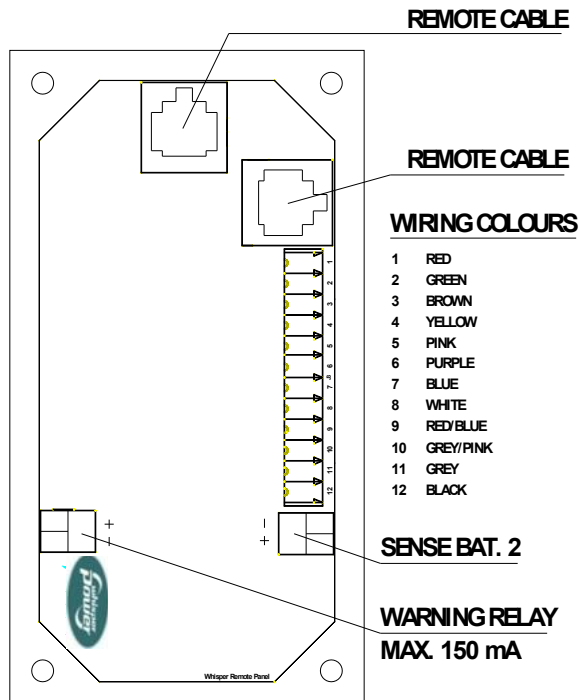


Figure 17: Remote box terminals

#### Acoustic alarm or warning lamp

One can connect an external max.150 mA relay to generate an acoustic warning or applying a warning lamp etc. Be aware of polarity as some relays has a diode inside and should be connected plus to plus en minus to minus as indicated. Refer to Figure 17.

#### Connection for emergency stop / fire alarm switch

The generator has an emergency stop button. In order to stop the generator automatically in case of a fire alarm, you can use the bypass connection between fastons J7 and J18 on the backside of the local control panel. See Figure 18. To do so, remove this bypass connection and then replace it by a potential free fire alarm switch with normally closed contacts.

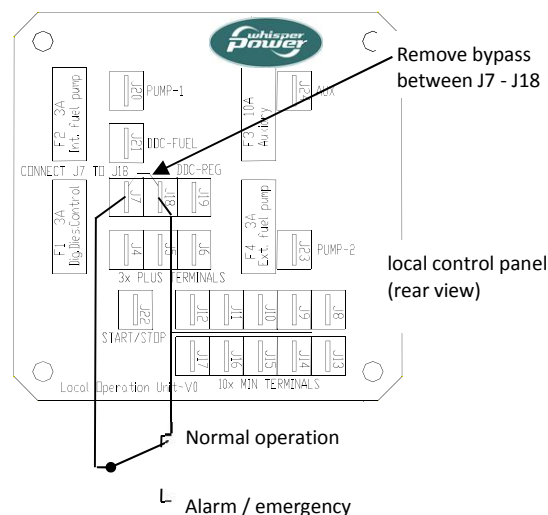


Figure 18: Emergency stop / fire alarm switch

#### Automatic starting and stopping



##### Automatic start/stop

WhisperPower cannot be held responsible for damage caused by the unattended running generator using the auto-start/stop mode or interval mode.



Using the auto-start/stop (interval) mode the generator can start unexpectedly. When working on the electrical system, the 3 Amp fuse must be removed from the control panel and the battery plus cable must be removed from the battery.

The WhisperPower Digital Diesel Control system offers several options for automatic starting and stopping.

Access to this menu and other menus could be blocked. For de-blocking and setting up this options refer to the APPENDIX of the DDC user's manual.

One of these options is to monitor a second battery (not being the starter battery) to start the generator automatically when the voltage of this battery drops below a certain setting.

Other names for this second battery are "auxiliary battery", "service battery", "users battery" or "consumers battery". We will refer to this battery as "the second battery"(BAT2). In some menus the starter battery could be indicated as "the first battery" (BAT1).

A sense wire to monitor the second battery should be connected (attention polarity!) to the connector on the back of the remote panel. Refer to Figure 17. The sense wires must be connected directly on the second battery before a main switch and be protected by a 3 Amps fuse.

(Monitoring the generator starter battery does not require an extra sense connection)

#### Settings

When choosing other settings than the factory settings, refer to the DDC user's manual, especially to the APPENDIX.

##### 1.5.4.2 Starter battery

For starting, the generator set requires a 12V starter battery of at least 145Ah. The generating set can be connected with the main engine battery or have its own battery.

We strongly recommend the use of a separate battery for the generating set and to keep the wiring system for the propulsion engine and the domestic DC supply system completely separate and individually connected to separate batteries.

However, the negative of all the batteries on the vessel should be interconnected to avoid difference in the voltage level of the earth on different places causing trouble to electronic devices which might be in the system.

The above recommendation is not valid for ships having the starter battery of the propulsion engine or other auxiliary

equipment positive grounded. When this is the case an expert should be consulted.

A battery switch may be used to interrupt the positive connection.

The starter battery is charged by the alternator on the engine. An additional battery charger will help to keep the battery in good condition when the generating set is not used.

A battery charger is not included in the standard supply. A high efficiency battery charging unit can be ordered from WhisperPower which is able to charge both the ship's main battery and the starter battery. Also a small charger can be used to charge the starter battery only, such as the WBC-Handy 70. A battery switch and a charger are included in the battery installation kit, art. no. 40290108.

#### 1.5.4.3 Other recommendations and warnings

The battery should be secured for poor road conditions and the terminals should be insulated. For extra safety the battery can be enclosed in a wooden, plastic, fibreglas etc. (non metal) box. Even when the earth return system is applied a negative battery cable should be used and the vehicle should not to be used as a conductor.

The battery cables are supplied in a standard length of 1.5 m, if longer cables are required a larger cross sectional area should be considered to compensate for voltage reduction.



When two batteries are used in series to provide a 24 Volt supply system, never take off 12 Volt (starting) power from one of these batteries. This will result in severe damage to both batteries within a short time.

Disconnect the battery leads if electrical welding is to be carried out, otherwise damage will be caused to the diodes of the alternator.



As explosive hydrogen gases may be discharged during charging, the battery should be located in a well-ventilated room. Ensure that the supplied battery cable connectors are properly fitted and never remove during or shortly after charging as sparking can occur, which may ignite the hydrogen gases.

### 1.5.5 AC power system (230 / 400 Volt)

#### 1.5.5.1 General



Before installation, read the sections on safety in the user's manual.

Be sure that all electrical installations (including all safety systems) comply with all required regulations of the local authorities. All electrical safety/shutdown and circuit breaking systems have to be installed onboard as the generating set itself cannot be equipped with such equipment for every possible variation.

The vessel's power supply system should be suitable and safe for the AC voltage which is applied and the power that will be

generated. Special attention has to be paid on dividing the system in branches which are fused individually.

It is absolutely essential that each and every circuit in the electrical system is properly installed by a qualified electrician.

With the M-SQ 27 kVA / 25 kW connected as a three phase 230/400 Volt generator (star configuration), 3x 400 Volt is available between the phases. At the same time 230 Volt is available between every phase and neutral, the maximum output being 15 kW for a single phase.

In general, the installation should be laid out in such a way that there is a reasonable balance of load between the three phases. To avoid problems with unbalanced loads one could apply a 400V 3 phase to 230 Volt single phase transformer.

#### 1.5.5.2 Fuses

Fuses should be installed between the generating set and the electrical installation to protect the installed electrical system. Using three phases the fuses should be three times 36 Amps and mechanically connected. The fuses must be of the slow reacting type. For electrical motors connected to the system, a motor protection switch must be installed.

#### 1.5.5.3 Grounding

The AC alternator windings are not grounded. The housing of the alternator and all other metal parts are grounded. To make a connection between "neutral" and "ground" is necessary as part of a specific insulation failure protection system.

Small pleasure craft in Europe (length up to 24 meter) is submitted to The Recreational Craft Directive 94/25/EC. The guidelines of this directive refer to (ISO 13297).

When the installation comply to this standard the "neutral" and "ground" should be connected on the generating set by connecting the blue (neutral) wire with the terminal on which the yellow/green wire is connected.

A Ground Fault Circuit Interrupter (GFCI) or similar device must be applied



#### WARNING

In all situations the transfer switches between shore, inverter and generator should switch all connections, the line(s) as well as neutral.

Be aware that insulation protection systems can be different for different applications and even within the ship there could be different standards for different spaces. We did refer to the Recreational Craft Directive that applies to pleasure craft up to 24 m of length. Sometimes one has to comply with other standards such as the rules of certification societies like Lloyds Register of Shipping or Veritas, regulations for the protection of personal, building legislation, etc. It is of the greatest importance to have expert advice on this issue.

For safety reasons connect the main ships ground to negative point of the generating set start battery. When a ungrounded

DC system or positive grounded DC system is applied the battery negative should not be connected to the main ships ground.

#### **1.5.5.4 Cable**

For the power cable we recommend the use of 5 wire tri-phase oil resistant cable with a sufficient cross sectional area. One wire for earth is included. For long cables it is recommended to apply cables with a larger cross section (refer to ISO 13297 annex A).

#### **1.5.5.5 Transfer switch**

A power source selector switch must be installed between the generating set and the ship's electrical supply system. This switch must ensure that all AC consumers can be switched off at once. This switch should also be installed to keep the generating set and shore (grid) power systems separate.

Transfer switches - to switch over from shore to ship or from generating set to inverter - should be well designed to switch over all wires including neutral (and not only phases or line) and there should be provisions with the aid of timers to prevent relays from clattering.

## 2 INSTALLATION SPECIFICATIONS

### 2.1 GENERAL

- 1 Install the genverter on a solid surface, without additional vibration dampers.
- 2 Connect the (sea) water inlet to the strainer.
- 3 Connect exhaust system.
- 4 Connect a siphon breaker or 'air vent' into the cooling circuit, if necessary.
- 5 Connect 'fuel supply line' to the water separator/ fuel filter.
- 6 Connect 'fuel return line' to the fuel tank.
- 7 Connect remote panel (just plug in).
- 8 Connect the AC cable from the AC box to the power source selector or transfer switch.
- 9 Connect plus and minus from the 12V starter battery to the battery cables.
- 10 Install a WhisperPower battery charger. (optional)

### 2.2 COMMISSIONING TABLE

- 1 Check if a siphon breaker (air vent) is necessary and has been installed
- 2 Open the seawater inlet valve and check all water connections. Check if the strainer is installed on or just above the seawater level.
- 3 Check if the exhaust system is properly installed. Check maximum length of exhaust hose, diameter of exhaust hose, position of the water lock, maximum lift. Also check the minimum required height of 60 cm above sea level of the exhaust loop (goose neck).
- 4 Open the seawater outlet valve and check all water connections.
- 5 Check the AC cables and the grounding.

- 6 Check if an AC breaker is installed before or after the power source selector. When there is only a circuit breaker, use it to disconnect the generating set from the grid.
- 7 Check all DC connections, check if the battery switch/ circuit breaker is closed.
- 8 Open the fuel valve. Check if there are no air leaks in the fuel supply line, and check if the lift of the fuel is less than 1 meter. Check if there is no air in the water fuel separator.
- 9 To bleed the fuel system use the manual pump by turning the cap loose and pumping as long as necessary to bleed the system
- 10 Check if the air intake in the canopy is not blocked.
- 11 Check the oil level and color of the oil. Check the coolant level
- 12 Start the engine by pushing the start button
- 13 Check when the generating set is running, the delay of 5 to 10 seconds in the power source selector transfer.
- 14 Check voltage and frequency under 'no load' conditions.
- 15 Check voltage and frequency under 'full load' conditions.
- 16 Check if the battery charger of the generating set is working (max. 14.5 Volt).
- 17 Close the sound shield and check the noise level.
- 18 Stop the generating set and check the engine again for leakages of oil, fuel or water.

Installation checklist available on our website:  
[www.whisperpower.com](http://www.whisperpower.com).

Commissioning form available on our website:  
[www.whisperpower.com](http://www.whisperpower.com).

## 2.3 TECHNICAL DATA

### M-SQ 27 kVA / 25 kW

Dimensions incl. sound shield	156 x 75 x 81 cm (L x W x H)
Dimensions w/o sound shield	140 x 60 x 73 cm (L x W x H)
Weight incl. sound shield	660 kg
Weight w/o sound shield	550 kg
Max. operation angle	25°
Remote panel 15 m cable	Digital Diesel Control System
Battery capacity min.	145 Ah
Fuel consumption	1 – 6 l/h, load dependent
Lift fuel pump	Mechanically driven; manual priming
Max lift fuel pump	1m
Cooling	Indirect cooling
Minimum water supply	20-25 l/min
Alternator	synchronous brushless, maintenance free, water cooled
Voltage regulation	AVR
Output power at power factor $\cos \phi = 1$	25kW, 230/400V 50Hz
Battery charger	alternator including regulator (50 Amps)

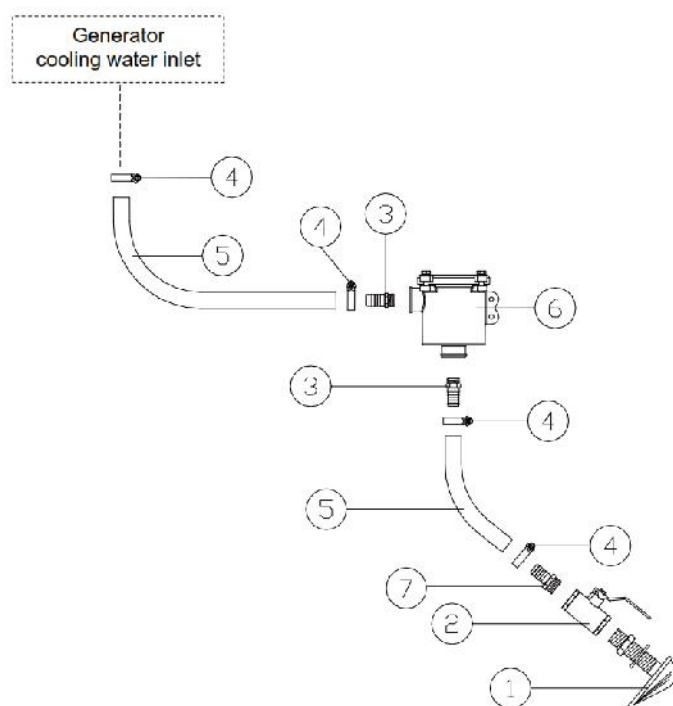
## 2.4 SPECIFICATIONS OF THE ACCESSORIES

Water pickup scoop	1" = 25,4 mm
Inlet valve	1" in / 25,4 mm out
Water strainer	25,4 mm in, 25,4 mm out
Air vent	25,4 mm
Inlet suction hose	25,4 mm
Fuel filter/water separator	30 micron
Fuel inlet and return	8 mm
Exhaust hose	Ø 63 mm inner
Water lock	Ø 63 mm
Water/gas separator	Ø 63 - 51 - 63 mm

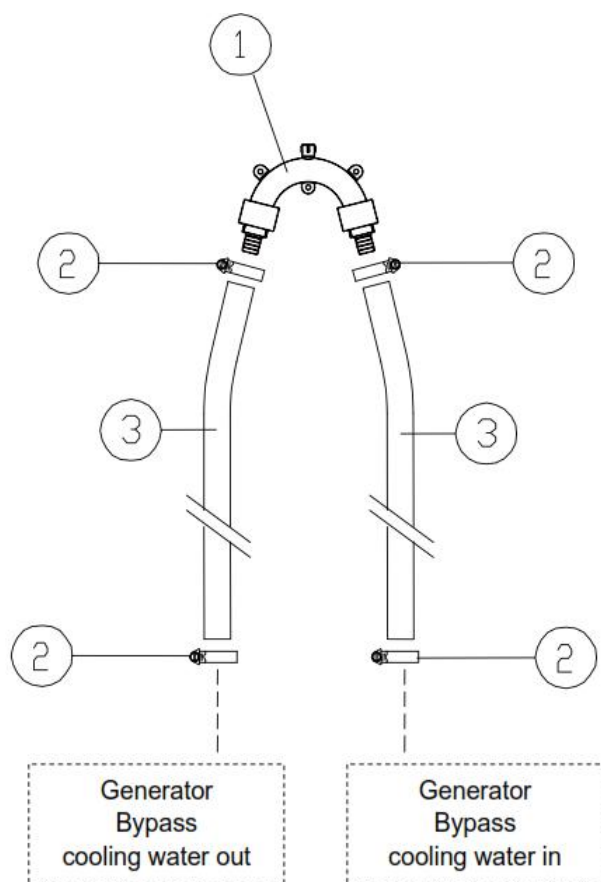


## 2.5 INSTALLATION MATERIALS

### WATER INLET KIT 1" (25 mm)

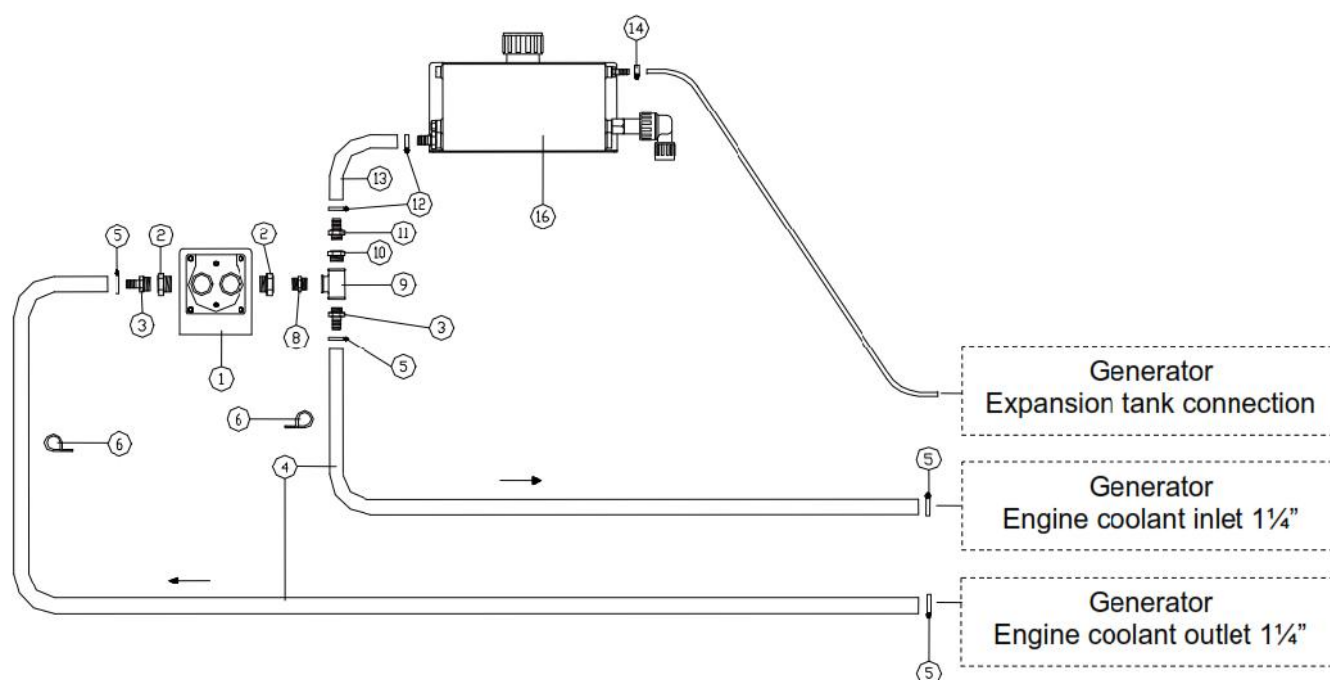


no	qty	article no	description	dimensions
1	1	50230053	Water pickup scoop	1"
2	1	50230043	Lever operated ball valve f/f	1"
3	1	50221010	Male hose connector	1"x 25 mm
4	4	50221503	Hose clamp, stainless	25-40 mm
5	3	50220050	Raw water hose	25x33 mm
6	2	50221008	Male hose connector	¾"x 25 mm
7	1	50230061	Nickel plated brass intake strainer	3/4
<b>TOTAL</b>		<b>40230221</b>	<b>WATER INLET KIT 25 mm</b>	

**SYPHON BREAKER KIT 1" (25 mm)**


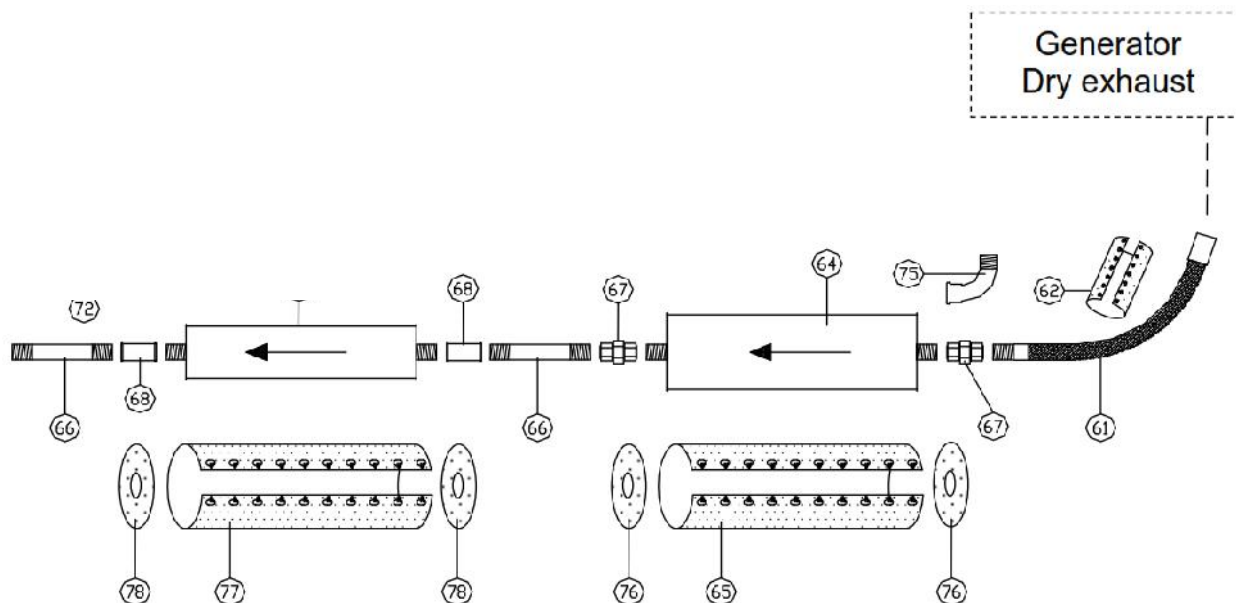
no	qty	article no	description	dimensions
1	1	50230025	Syphon breaker (including valve assembly)	25 mm
2	4	50221503	Hose clamp	25-40 mm
3	3 m	50220050	Raw water hose	25 x 33 mm
<b>TOTAL</b>		<b>40230274</b>	<b>SYPHON BREAKER KIT 25 mm</b>	

# BOX COOLER KIT

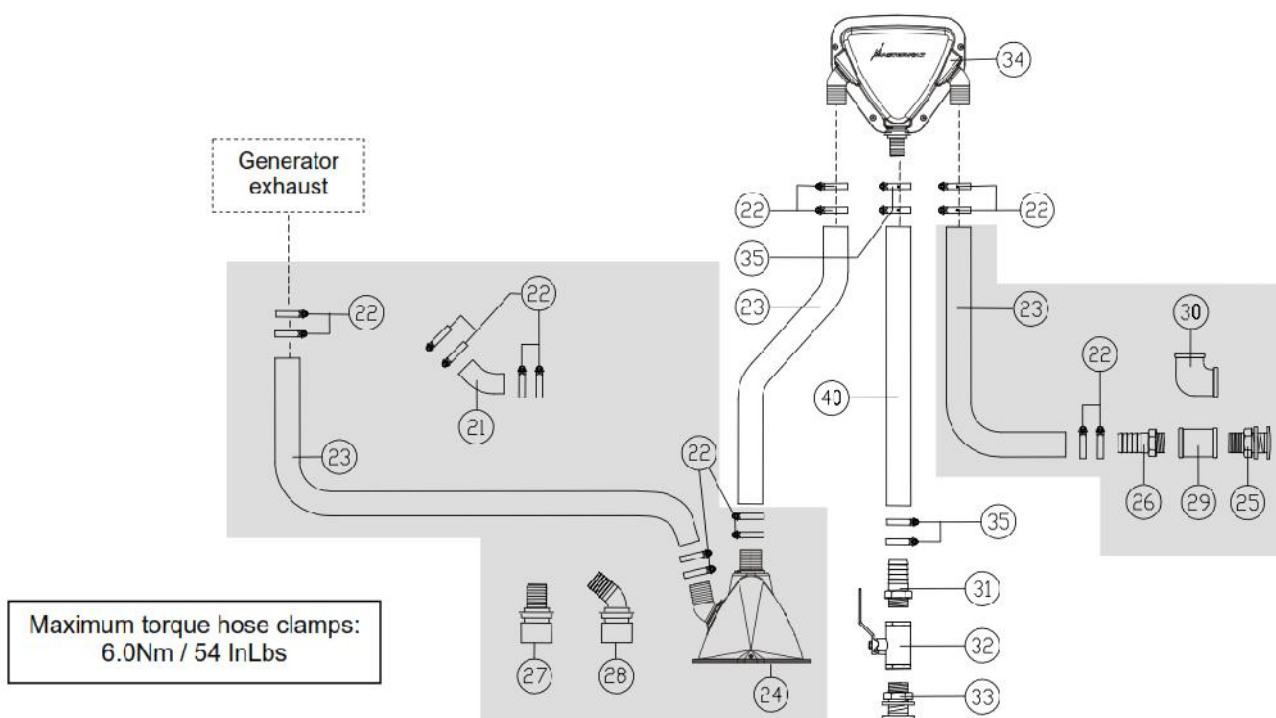


no	qty	article no	description	dimensions
1	1	50230589	Box cooler 140-120, 1½" thread	
2	2	50221109	Straight reducer m/f	1½"-1"
3	2	50221014	Male hose connector	1"x35mm
4	6m	50220013	Radiator hose, smooth	35x45mm (1¼)
5	4	50221504	Hose clamp, stainless	32-50mm
6	8	50221597	Hose support, stainless	45x20mm
8	1	50221064	Double male nipple	1"
9	1	50221044	TEE fitting	1"
10	1	50221103	Straight reducer m/f	1-¾"
11	1	50221004	Male hose connector	¾"x20mm
12	2	50221502	Hose clamp, stainless	20-32mm
13	1m	50220011	Radiator hose, smooth	18x26mm (¾")
14	1	50221532	Mini hose clamp, stainless	9-11mm
16	1	50230535	Expansion tank, 7L with low-level alarm kit	
<b>TOTAL</b>		<b>40201894</b>	<b>BOX COOLER KIT</b>	

# DRY EXHAUST KIT



no	qty	article no	description
61	1	50220067	Exhaust hose, 2" stainless 500mm f/m
62	1	50220042	Insulation blanket 52x26 for exhaust hose
63	1	50230574	Absorption muffler, steel 2"
64	1	50230575	Resonance muffler, steel 2"
65	1	50230576	Insulation blanket 70x55 for muffler HD 2"
66	2	50221404	Pipe nipple, galvanized 2"x300mm
67	2	50221424	Parallel male coupling, 1½" galvanized
68	2	50221414	Straight coupling, 2" galvanized f/f
69	3	50221668	U-clamp 73 mm M10
70	3	50221664	Bracket for U clamp, 25cm 48-60mm passivated
71	6	50211406	Washer, zinc-plated M10
72	6	50211448	Spring washer, zinc-plated M10
73	6	50211466	Hex nut, zinc-plated M10
75	1	50221476	Elbow, 90 deg 2" galvanized m/f
76	2	50230577	Insulation blanket end cover HD 2"
77	1	50230578	Insulation blanket for muffler SDHD 2"
78	2	50230579	Insulation blanket end cover SDHD 2"
<b>TOTAL</b>		<b>40201889</b>	<b>DRY EXHAUST KIT 2"</b>

**WATER SEPARATOR AND WET EXHAUST KITS (63 mm)**


no	qty	article no	description	dimensions
34	1	40230194	Delta-shaped water separator L 63-51-63	
40	1.5	50220035	Marine exhaust hose	51 mm
23	2.5	50220036	Marine exhaust hose	63 mm
31	1	50221020	Male hose connector	1½" x 51 mm
35	4	50221541	HD hose clamp	51-63 mm
22	8	50221542	HD hose clamp	63-75 mm
33	1	50230034	Brass through hull fitting	1½" x 70 mm
32	1	50230045	Lever operated ball valve f/f	1½"
<b>TOTAL</b>		<b>40230264</b>	<b>WATER SEPARATOR KIT (63 mm)</b>	
22	8	50221542	HD hose clamp	63-75 mm
23	3	50220036	Marine exhaust hose	63 mm
24	1	40230191	Delta-shaped water lock L 63MM 16 Ltr	
25	1	50230036	Brass through hull fitting	2 ½ x 122 mm
26	1	50221012	Male hose connector	2½" x 63 mm
27	1	50221098	Brass straight coupling FF	2½"
28	1	50221078	Brass elbow f/f	2½"
<b>TOTAL</b>		<b>40230254</b>	<b>WET EXHAUST KIT (63 mm)</b>	
<b>OPTIONAL INSTALLATION MATERIALS</b>				
21A	1	50230087	Elbow 45° exhaust hose adapter	63 mm
22	4	50221542	HD hose clamp	63-75 mm

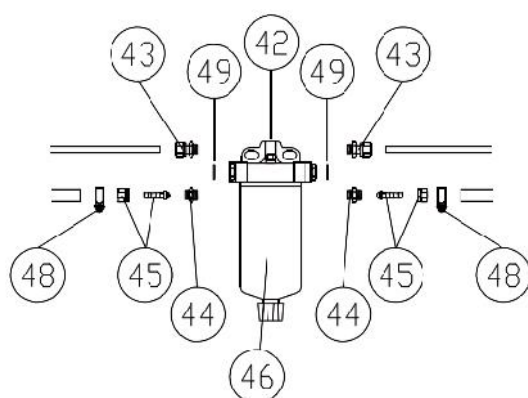
# BATTERY INSTALLATION KIT

article no	description	dimensions
61112007	WBC-Handy 70 charger 12V / 7A	225 x 50 x 50 mm
40290093	battery terminal (NEG-)	
40290094	battery terminal (POS+)	
40290099	M8 battery pole adapter set	
40290098	isolation caps (red&black)	
502144701	WP-Compact Manual Battery Switch, 300A	72 x 72 x 78 mm
<b>40290108</b>	<b>INSTALLATION KIT FOR BATTERIES &gt; 100 Ah</b>	

# RECOMMENDED BATTERY

article no	description	dimensions
40290062	AGM-Power 12V 145Ah Absorbed Glass Matt	340 x 173 x 280 mm

# FUEL KIT



no	qty	article no	description	dimensions
42	1	50230091	Filter head for fuel strainer/water separator	M14x1.5 mm
43	2	50221618	Parallel male coupling	M14 - 8 mm
44	2	50221619	Parallel male coupling	M14 - 10 mm
45	2	50221620	Hose connection, outer cone	M16x1.5 mm, 8 mm
46		50230092	Filter for fuel strainer/water separator	
48	4	50221522	Hose clamp, stainless	10-16 mm
49	2	50221632	Gasket ring	18x14x1.5 mm
not shown	2	50221203	Straight coupling	8 mm
not shown	2	50221252	Barbed-smooth hose nipple	8 mm
<b>TOTAL</b>		<b>40230205</b>	<b>FUEL KIT</b>	

# OPTIONAL INSTALLATION MATERIALS

no	qty	article no	description	dimensions
48	1	50221522	Hose clamp, stainless	10-16 mm
not shown	per m	50222020	copper fuel pipe	6x8 mm
not shown	per m	50220063	fuel hose	8x16 mm

### 3 DIAGRAMS & DRAWINGS

#### 3.1 GENERAL VIEW OF CONNECTIONS

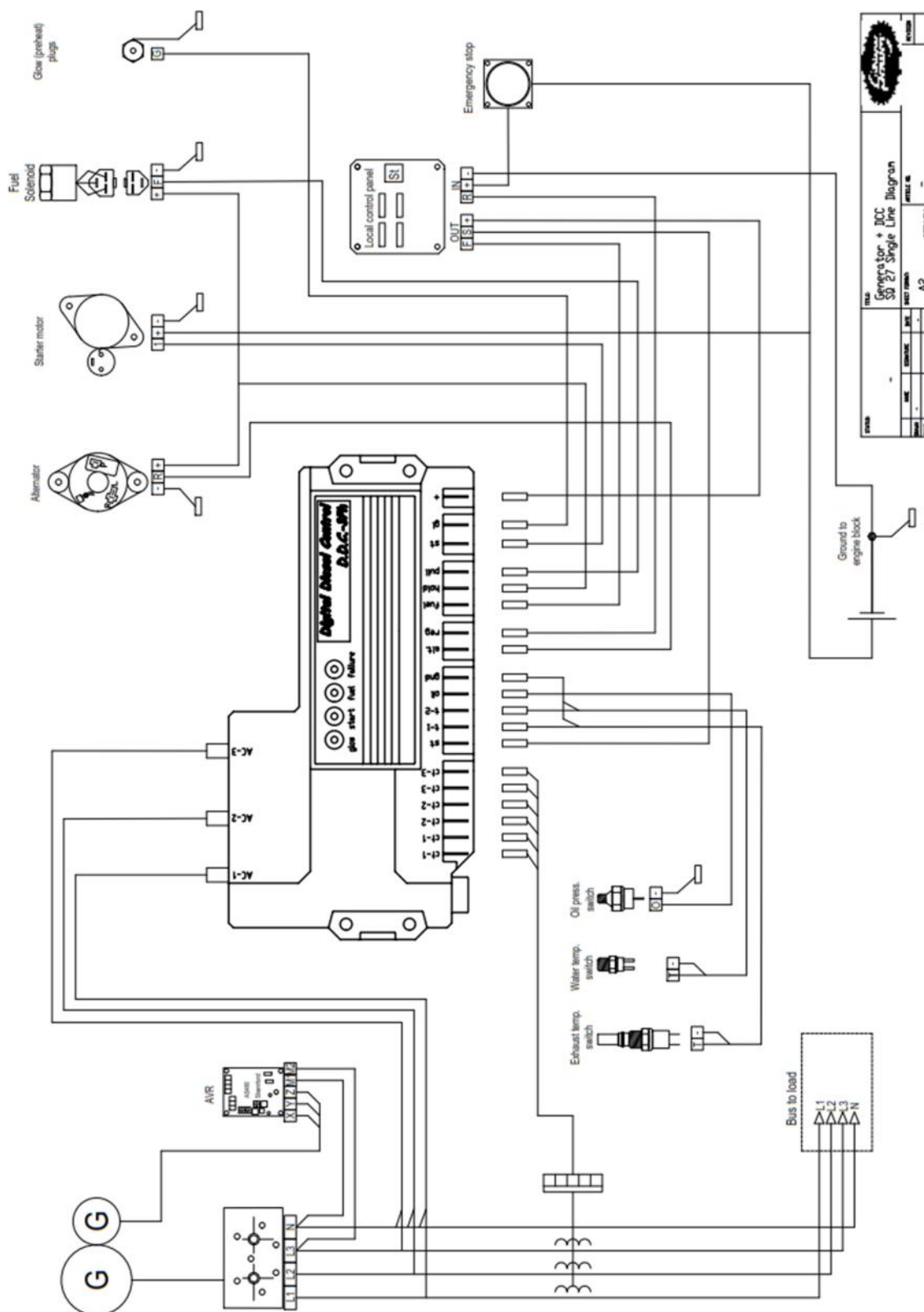


Figure 20: General view of W-SQ 27 kVA / 25 kW connections



### 3.2 AC WIRING DIAGRAM

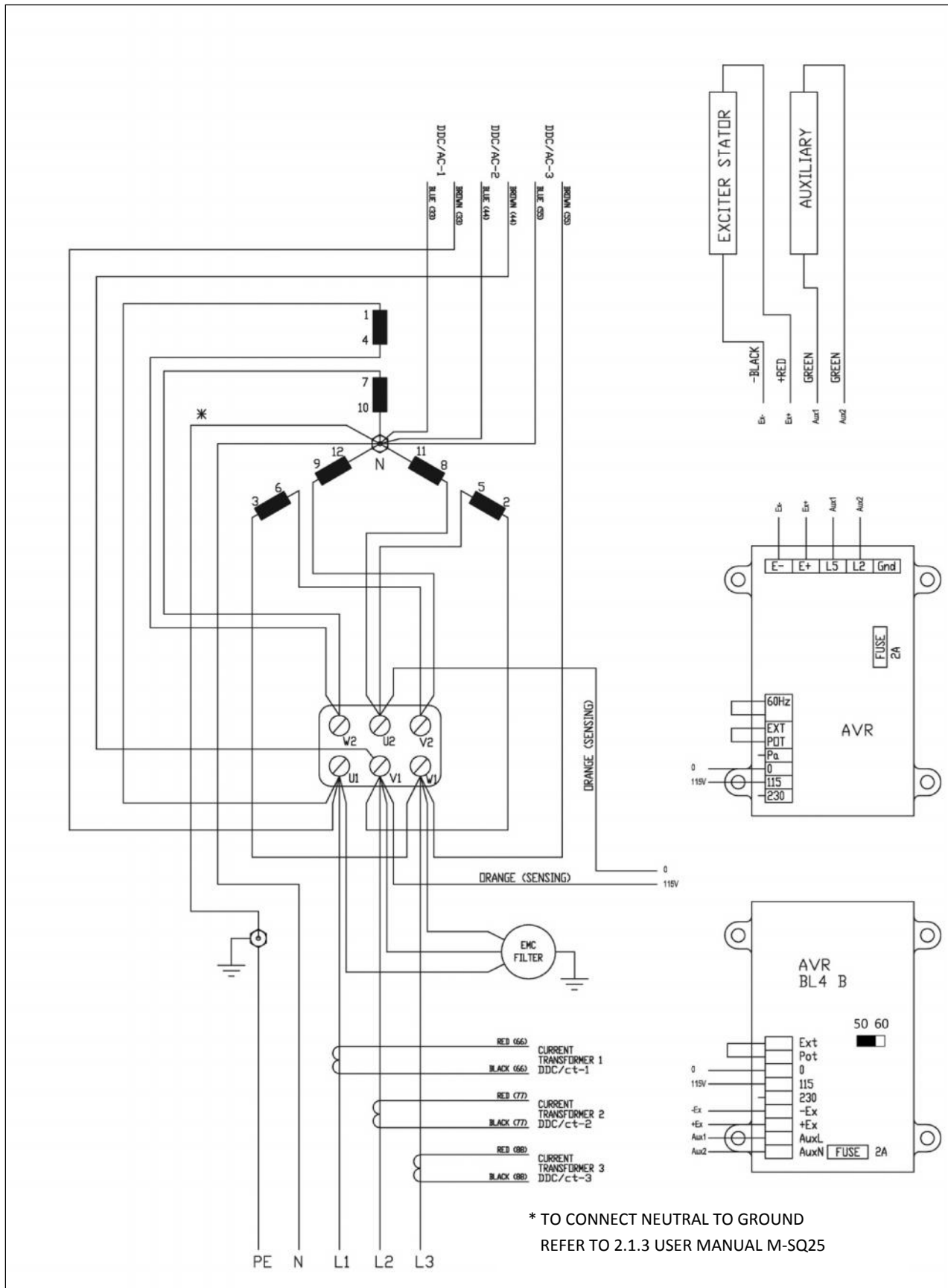


Figure 23: AC wiring diagram 3 phase 230V – 400V 50Hz with AVR

### 3.3 REMOTE CONTROL PANEL

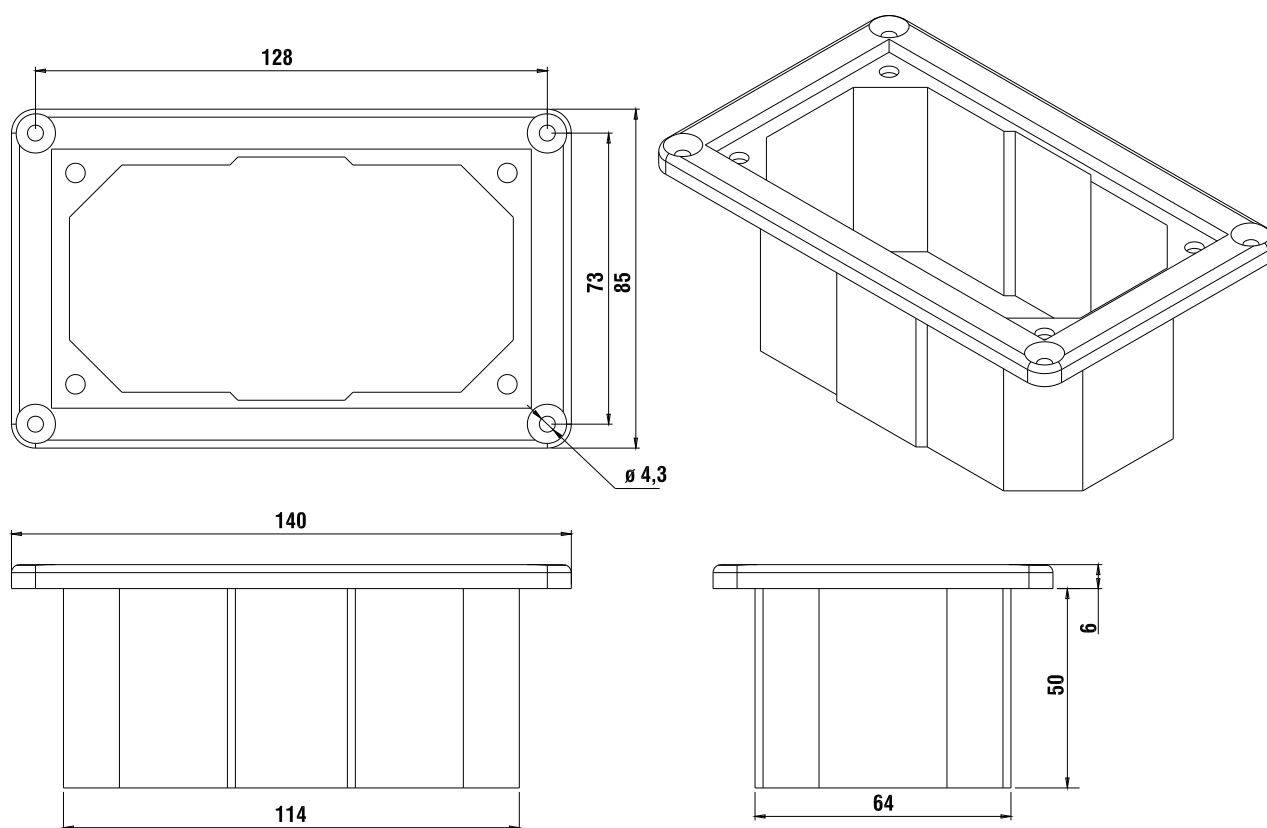


Figure 24: WhisperPower remote panel

The remote panel comes in a carton that can be used as a template to drill the mounting hole.

### 3.4 DIMENSIONS AND FOOTPRINT

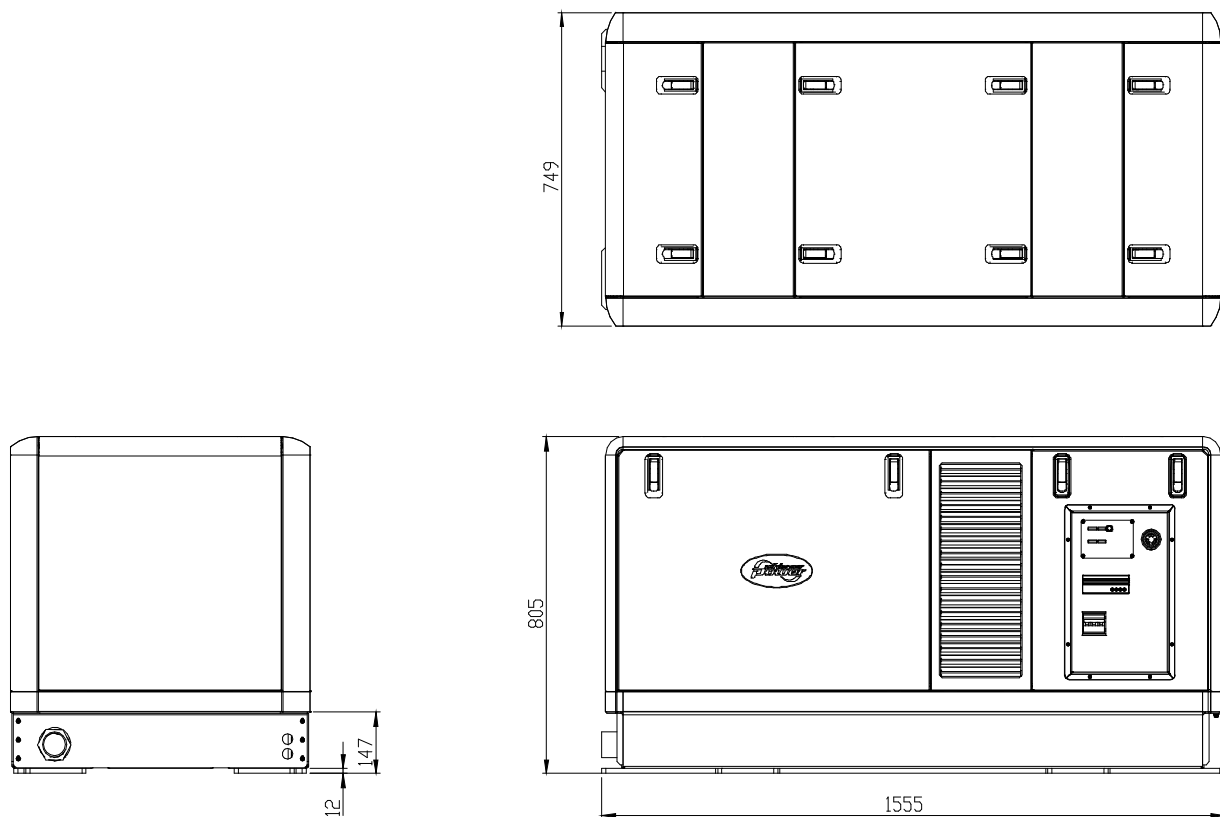


Figure 25: M-SQ 27 kVA / 25 kW dimensions and footprint

#### M-SQ 27 kVA / 25 kW CONNECTIONS:

- exhaust: 2"
- fuel hose: 8 mm
- cooling water in: Ø 35 mm
- battery +: 35 mm<sup>2</sup>
- battery -: 35 mm<sup>2</sup>

#### POWER CABLES

- M-SQ 27 kVA / 25 kW 230/400V 5x6 mm<sup>2</sup> (not included)  
3 phases (3x 36Amps)

#### REMOTE CABLE (ALL MODELS)

- 8 wire communication cable, 15 meter (included).

For longer lengths (max. 30 m), refer to WhisperPower service department

#### M-SQ 27 kVA / 25 kW DIMENSIONS

	Incl. sound canopy	Without sound canopy
• length	156 cm	140 cm
• width	75 cm	60 cm
• height	81 cm	73 cm
• weight	660 kg	550 kg

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