



INSTALLATION MANUAL U.S.A. EDITION

WHISPER 3,5

-3600 RPM-

Marine diesel generating set 120V-60Hz

Digital Diesel Control



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This manual applies to the Mastervolt Whisper 3,5 Marine Diesel Generating set controlled by Digital Diesel Control first launched in April 2004. For earlier models refer to other manuals available on our website: www.mastervolt.com.

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1 INSTALLATION

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.

1.1 LOCATION

Since Whisper generating sets have extremely compact dimensions, they can be installed in tight locations. 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 raw water pump and oil strainer.

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

1.2 INSTRUCTIONS FOR OPTIMAL SOUND AND VIBRATION INSULATION

Position the generating set as low as possible in the vessel. As the generating set is already secured to the base frame by means of flexible engine mountings, the frame can be mounted directly to the vessel's main structure.

1.2.1 Steel base plate

However to keep resonant vibrations at a minimum, it is recommended to mount the generating set on a solid steel base plate, approx. 1,18" (30 mm) thick weighing approx. 44 kg or 50% of the weight of the generating set. The engine draws its inlet combustion air through several holes in the capsule base. Therefore the capsule must be fitted with sufficient clearance between the capsule underside and the base plate. A steel base plate is available from Mastervolt as an optional accessory (ref. fig. 12, page 15).

1.2.2 Further recommendations

Whisper generating sets are standardly equipped with a "GRP" (Glass Reinforced Polyester) sound cover. The canopy has been designed to give effective sound insulation. For optimum sound and vibration dampening, the following factors should be considered.

- 1 Avoid mounting the generating set in close proximity to thin walls or floors that may cause resonance.
- 2 Sound dampening is extremely poor if the generating set is mounted on a light weight flimsy surface such as plywood which will amplify vibrations. If mounting on a thinner surface cannot be avoided, this should at least be reinforced with stiffening struts or ribbing. If possible, holes should be bored 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.
- 3 Never connect the base of the generating set directly to bulkheads or tanks.

1.3 VENTILATION

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 15 square inches (100 cm²) is required.

A "sealed" engine compartment must have a good extraction ventilator to maintain reasonable engine room temperatures. High temperature of intake air reduces engine performance and increases engine coolant temperatures. Air temperatures above 104 ° F (40°C) reduce the engine power by 2% for each 9° F (5°C) of rise. To minimise these effects the engine room temperature must not be more than 27° F (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 machine room ventilation, connections are to be made for an air inlet directly to the 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.

1.4 CONNECTIONS

The generating set comes supplied with all supply lines and output cable (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 front base. The connections are marked as shown in fig. 1.

All electrical connections, cable types and sizes must comply to the appropriate national regulations. Supplied cables are rated for ambient temperatures up to 160° F (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 section safety instructions in the user manual.

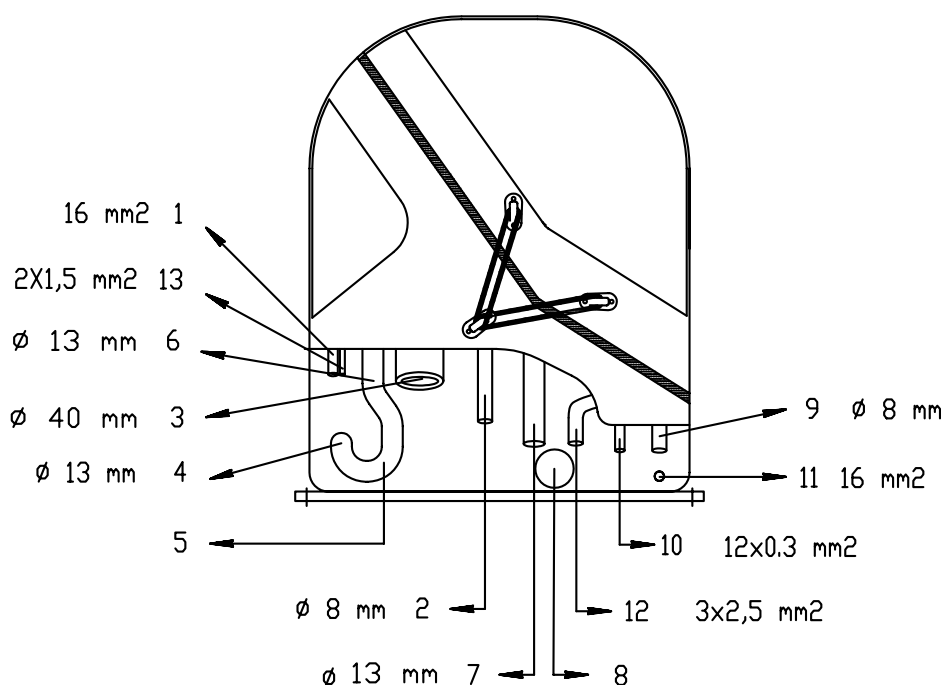
1.4.1 Fuel supply

1 FUEL TANK

Fuel tanks should be made of appropriate material such as (stainless) steel or plastic. Steel tanks should not be galvanised 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 instance connections are to be made at the top of the tank with internal tubing down to a few inches above the bottom of the tank.



- | | | | |
|----------------|---------------------|------------------|--------------------------|
| 1 Battery +; | 5 By-pass air vent; | 9 Fuel in; | 13 Cable fuel lift pump. |
| 2 Fuel return; | 6 Water return; | 10 Remote cable; | |
| 3 Exhaust; | 7 Water in; | 11 Battery -; | |
| 4 Water out; | 8 Oil strainer; | 12 AC cable; | |

Fig. 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 3 ft. (1 m).

If the pump has to lift the fuel higher than 3 ft. (1 m) an external fuel lift pump must be installed. The control board is already prepared to connect an extra fuel pump.

3 FUEL PIPES

When the tank is above the generating set we recommend ending the return line on the top of the tank (fig. 2). 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.

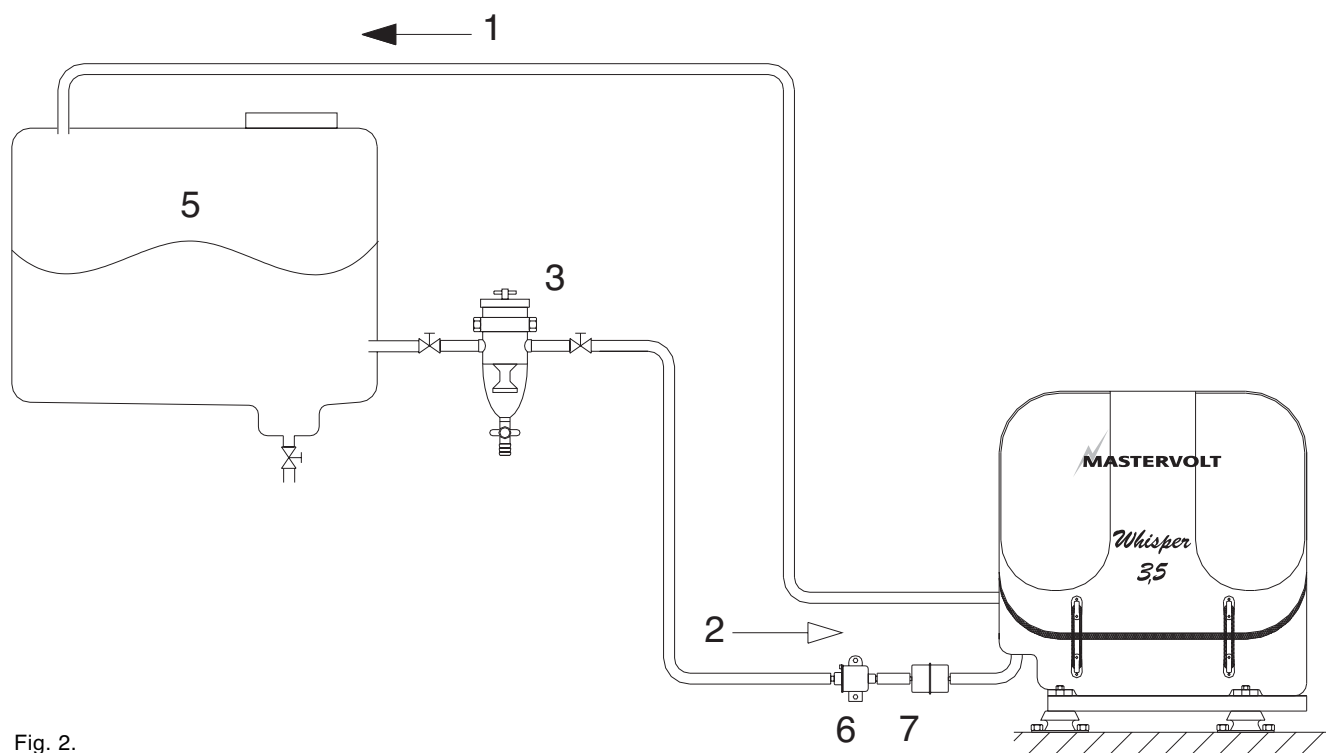


Fig. 2.

- | | |
|---|----------------------------|
| 1 Fuel return; | 5 Fuel tank; |
| 2 Fuel supply; | 6 Standard fuel lift pump; |
| 3 Prefilter / water separator (optional); | 7 Standard fuel filter. |

When the tank is below the generating set we recommend ending the return line on the bottom of the tank (fig. 3) below the inlet of the supply line to discharge under the lowest fuel level. This prevents air getting into the fuel line. Here also one needs a fuel cock only in the supply line.

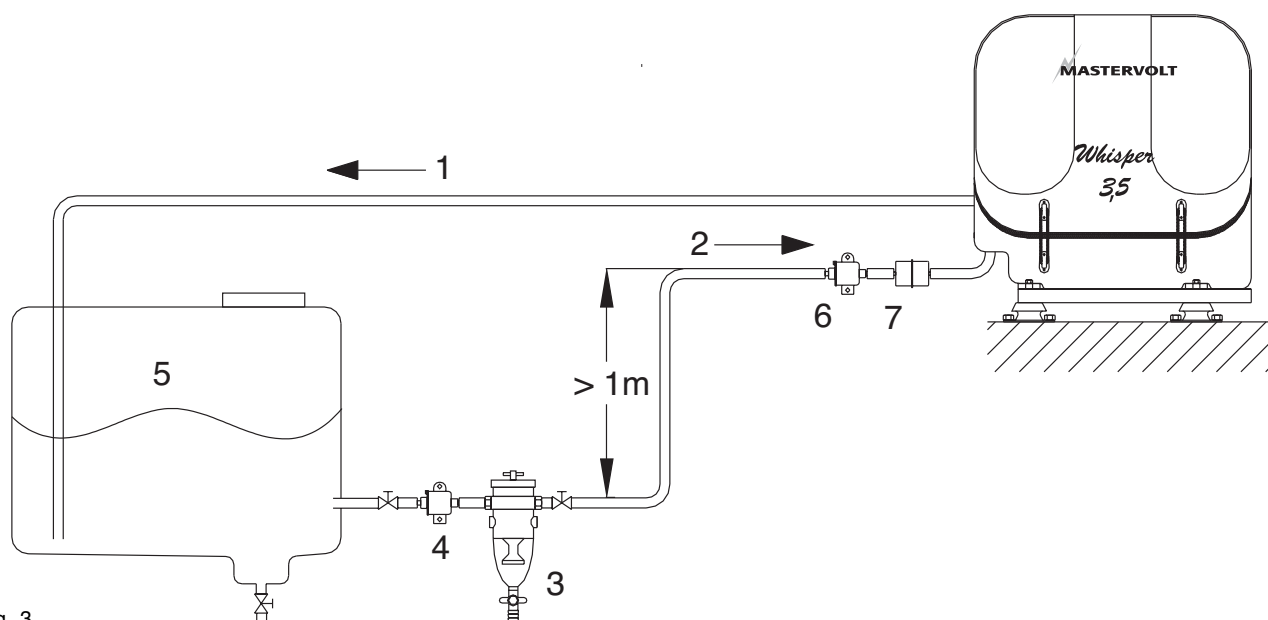


Fig. 3.

Both supply and return fuel pipe lines should be appropriate material and 5/16 inner diameter tubing. The quality of the tubing of fuel pipes could be submitted to local regulations depending on the application of the vessel.

The fuel pipes can be plumbed to the flexible hoses which are on the generating set. This fuel lines fulfils 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. Other consumers of diesel fuel, such as the propulsion engine and heaters, have to be connected to separate suction and return pipes

4 FUEL FILTERS

A fine fuel filter is installed which requires maintenance. Mastervolt 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 users manual.

- 1 Fuel return;
- 2 Fuel supply;
- 3 Prefilter / water separator (optional);
- 4 Extra fuel lift pump (optional);
- 5 Fuel tank;
- 6 Standard fuel lift pump;
- 7 Standard fuel filter.

1.4.2 Cooling

Intercooling is based on a raw water pump, heat exchanger and water-injected 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 to the following installation instructions.

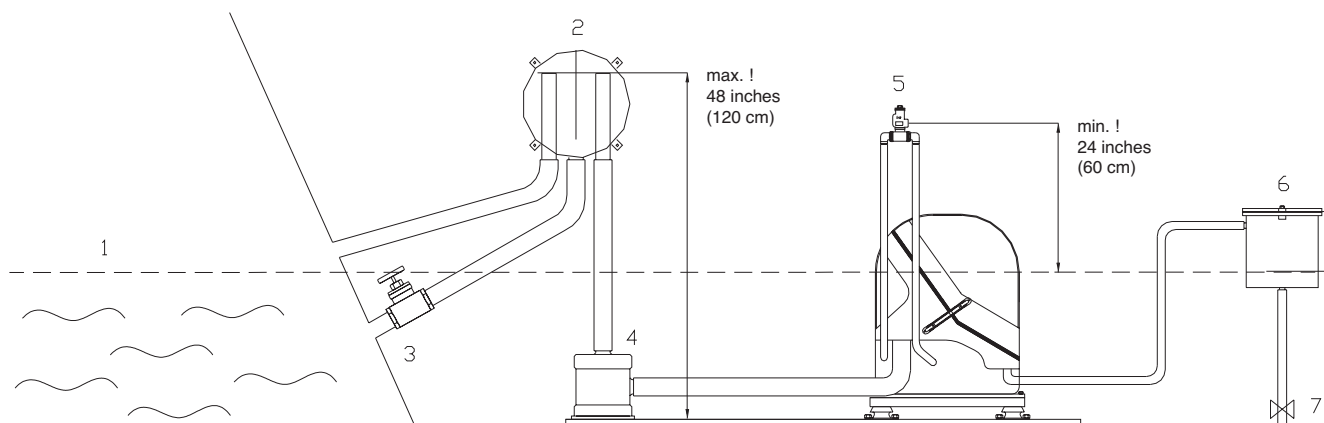


Fig. 4.

- | | |
|----------------------------|-------------------|
| 1 Water level; | 5 Air vent; |
| 2 Water/exhaust separator; | 6 Water strainer; |
| 3 Seacock; | 7 Seacock. |
| 4 Waterlock; | |

1 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, tru-hull fitting, inlet filter, etc.) must have an inner diameter of at least 1/2" (12.5 mm) diameter. 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 2 to 3 gallons/min. (8 to 12 litres /min.)

2 INSTALLATION OF 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 not using the generator, water will be forced into the inlet and your generating set will overflow!

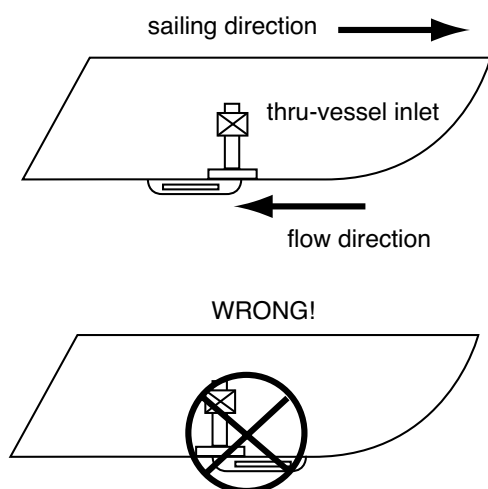


Fig. 5.

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. Use a sealant when mounting the skin fitting.

3 WATER STRAINER

Use an appropriate water strainer with connections of 1/2" (12.5 mm). Install the water strainer in a well accessible position, (refer to fig. 4-6) with the top 2 - 4 inches (5-10 cm.) above the waterline.

4 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 happening, the generating set is designed to accommodate a siphon breaker (air vent). In the standard delivery the connections are bypassed. Hose of 1/2" (12.5 mm) inner diameter should be used.

If the generating set cannot be mounted such that the bottom of the generating set is placed above the waterline, an air vent must be installed.

Extend the water hose of the by-pass 2 ft. (60 cm) above waterline and install an air vent (refer to fig. 15). 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). The hose of the drain should go downwards. Water must flow out freely; air must flow in freely as well.

Fast motorboats will lay deeper when sailing at large speed and can cause pressure on the waterinlet. This should be avoided to prevent flooding 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 WARRANTY

On the valve is a little hose to drain a little water that could be spilled from the valve. This hose should go down and may not end under water, because it should ventilate air into the valve to break the siphoning.

Check the air vent at regular intervals. Open, clean and lubricate the valve as required (fig. 6).

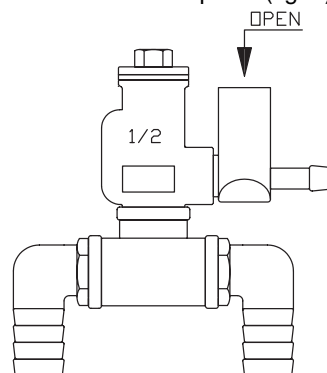


Fig. 6.

1.4.3 Exhaust system

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 STANDARD EXHAUST SYSTEM INSTALLATION

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 (ref. to fig. 7-1). The exhaust hose must have an inner diameter of 1 $\frac{5}{8}$ " (40 mm) -no less, no more-. The exhaust system must be installed so that the back pressure inside the exhaust does not exceed 0,8 psi 24 inches (60 cm.) waterpressure (refer to paragraph 5.4.3 of the users manual) and total length up to the outlet or water separator does not exceed 8 ft.(2,5 m). The exhaust hose descends from the capsule to the water lock. Then the hose rises maximum lift 4 ft. (120 cm) via the "goose neck" to the through-hull exhaust outlet, situated minimum 2 inches (50 mm) above the water line (refer to fig. 7-5. The "goose neck" must be

vertical and situated preferable along the ship's keel center line. It is recommended to install an extra muffler fig.7 (2) close to the through-hull fitting.



Because of the small gasflow of the small engine it is very important to keep strictly to the instructions above. Some mufflers and water locks cause too high back pressure. You are advised to use a Mastervolt installation kit or check the back pressure (refer to paragraph 5.4.3 of the users manual). Too high back pressure cause the system to fill up with water that affects the outlet valve and valve seat.

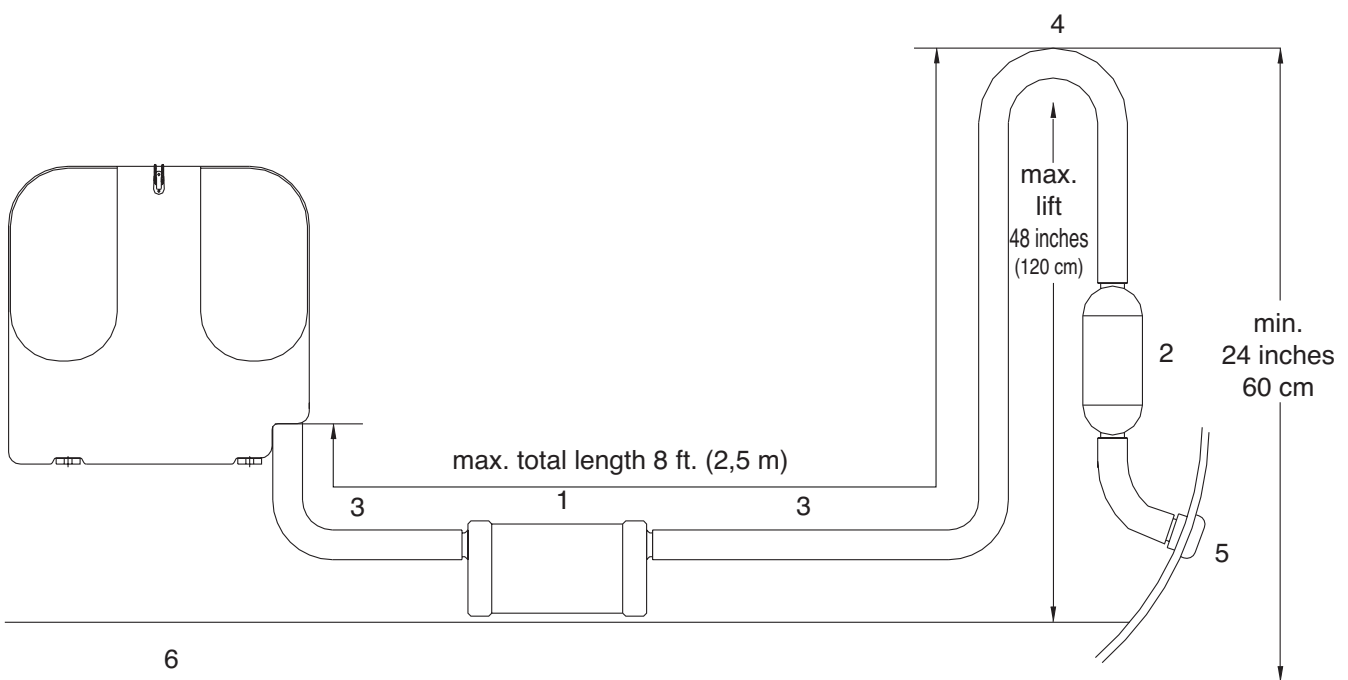


Fig. 7.

- 1 Exhaust water lock;
- 2 Exhaust outlet muffler;
- 3 Exhaust line 1 $\frac{5}{8}$ " Ø (40 mm);
- 4 Goose neck
- 5 Through-hull exhaust outlet 1 $\frac{5}{8}$ " Ø (40 mm);
- 6 Water level.

2 "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 drained through a line (A) separate from the exhaust fumes and also functions as a goose neck to prevent water from flooding the engine. The exhaust/water separator is mounted more than 2 ft. (60 cm) above the water level.

shortest possible path to the through-hull outlet. Under no circumstances the hose may go up again. (Refer to fig. 8a)

Only when using an exhaust /water separator the exhaust may have a length up to 25 ft (7,5m) after the water/gas-separator. However water traps should be avoided as the fumes still contain water and this should not accumulate in bents. An additional outlet exhaust muffler close to the hull outlet will help further to reduce noise emission. (Refer to fig. 9)

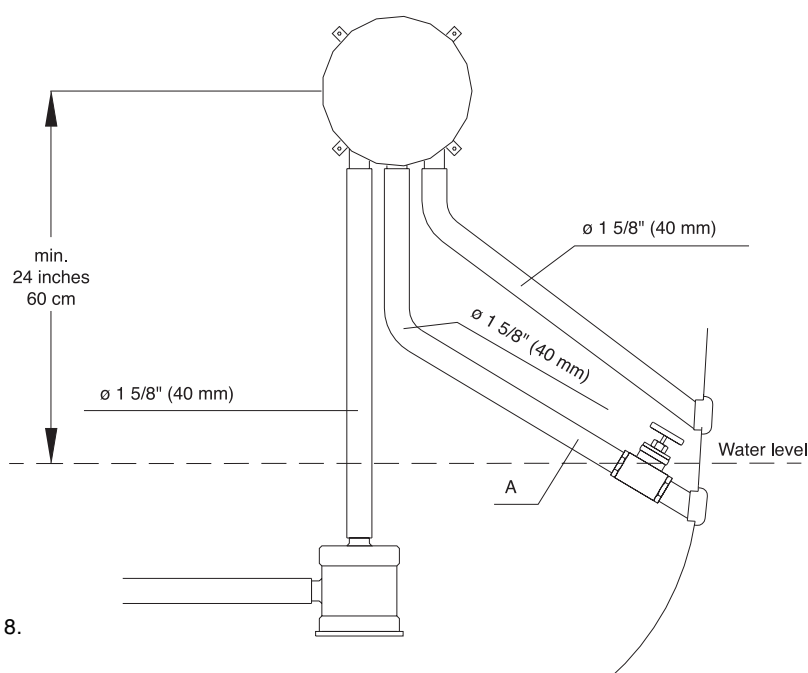


Fig. 8.

If the through-hull exhaust outlet has to be mounted far from the generating set, an exhaust/water separator must definitely be installed. (Total length of the exhaust piping from generator to top of goose neck (waterseparator) is more than 8 ft. (2,50 m.)) The sea water from the separator must run down along the

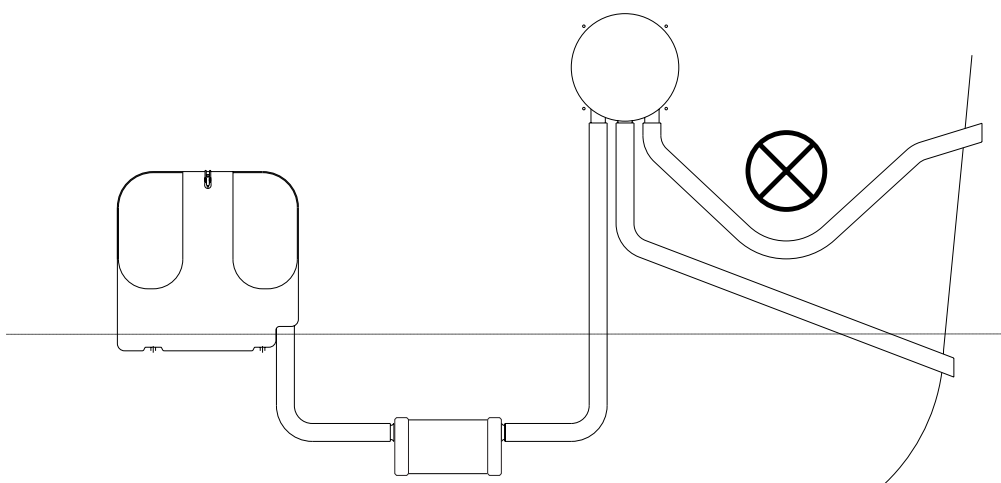


Fig. 8a.

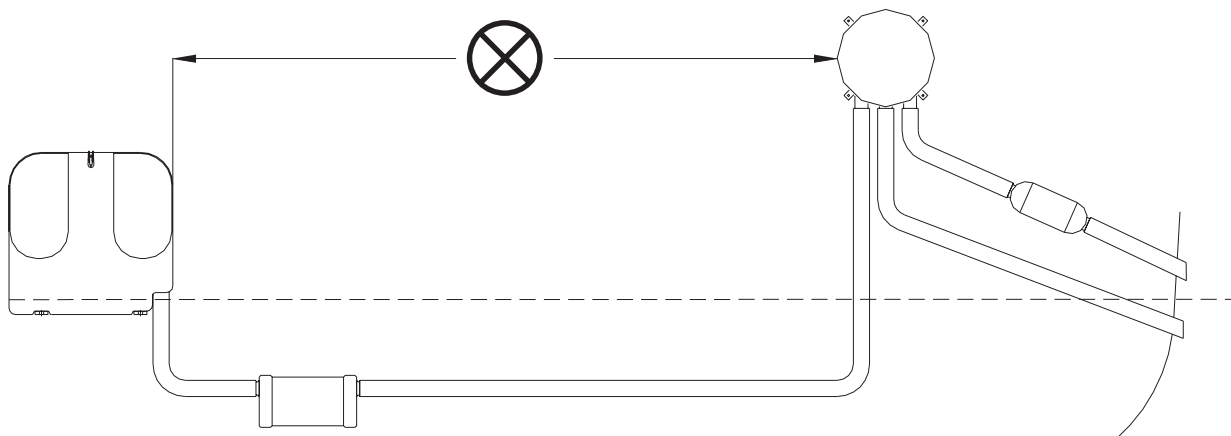
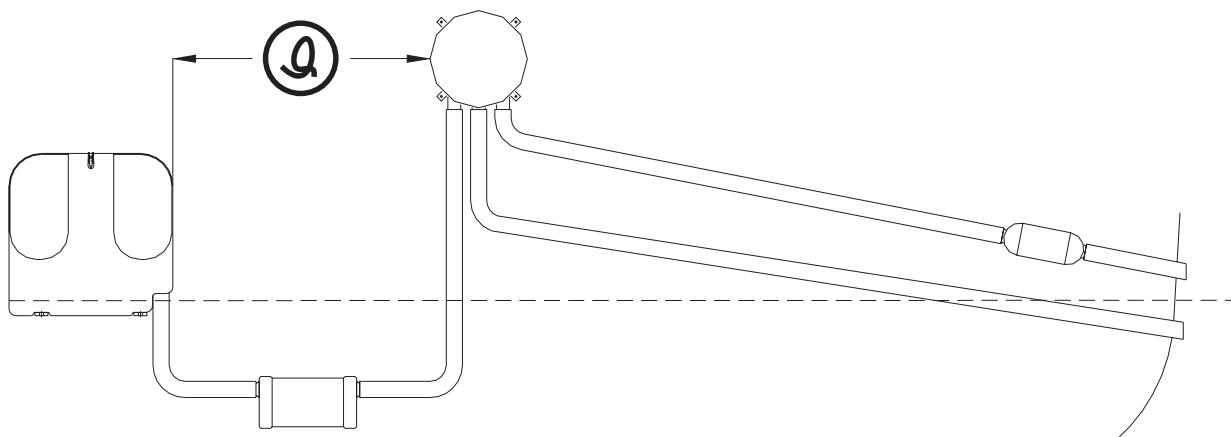


Fig. 9.



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 set noises are almost inaudible. For optimal noise reduction, the sea water outlet from the exhaust/water separator (center outlet on the unit) should run to the through-hull outlet below the water level along the shortest possible path. The through-hull outlet for the exhaust fumes should not direct the fumes directly toward the water surface as this will cause excessive noise (ref. to fig. 10).

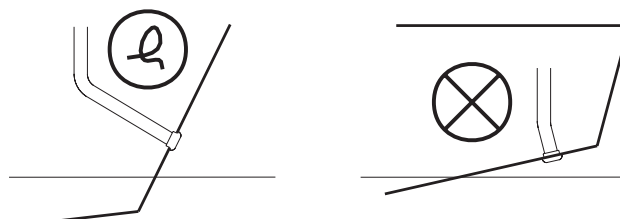


Fig. 10.



Do not direct the outlet directly toward the water surface.

1.4.4 Digital Diesel Control system (12 Volt)

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 aluminium vessels to prevent corrosion. All electrical wiring has been prepared on the generating set to the control panel prior to despatch 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 intermediate 8-pole cross-wired communication cable is in the standard supply too. If necessary an optional longer (max 30 m) intermediate cable can be connected if the standard length does not suit the required distance. When a longer distance than 30 m is required, consult the Mastervolt service department for advice. Refer to fig. 11.

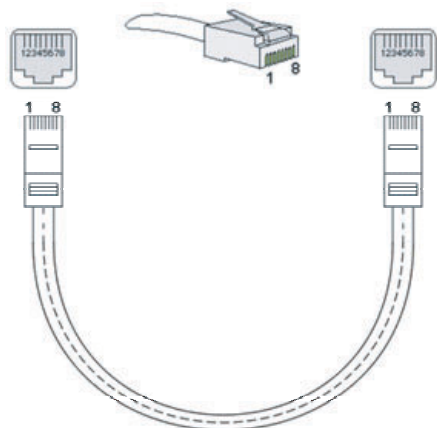


Fig. 11.

One can mount the control panel after drilling a hole in the dashboard using the plastic cover. Refer to the dimensional drawing in paragraph 3.5. The panel without the plastic cover fits the Mastervision modular panel system.

More 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 colour codes as indicated in fig. 12 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 up-date of the software of the system panel could be necessary. When this is the case consult to the Mastervolt 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 fig. 12.

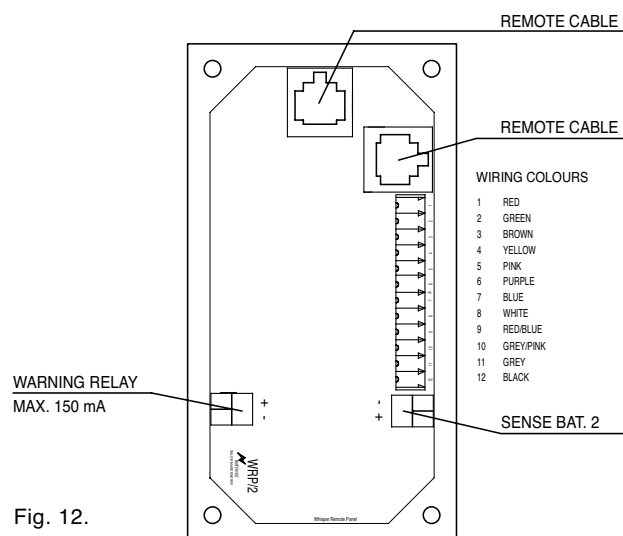


Fig. 12.

Acoustic alarm or warning lamp

One can connect an external max.150 mAmp 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 fig. 12.

Automatic start/stop

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

Access to this menu and other menus could be blocked. For blocking and setting up this options refer to the APPENDIX of the DDC users 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 fig. 12. 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 one want to apply other settings than the factory settings refer to the DDC users manual, especially to the APPENDIX.

2 STARTER BATTERY

For starting, the Whisper 3,5 requires a battery with a capacity of at least 55 Ah. 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 (when on earth) 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.

The starter battery is charged by the standard internal charger in the alternator. 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 Mastervolt 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 IVO SMART 12/10.

3 OTHER RECOMMENDATIONS AND WARNINGS

The battery should be secured for seagoing 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 vessel should not to be used as a conductor.

In the negative battery cable a 250 Amp starter batte-

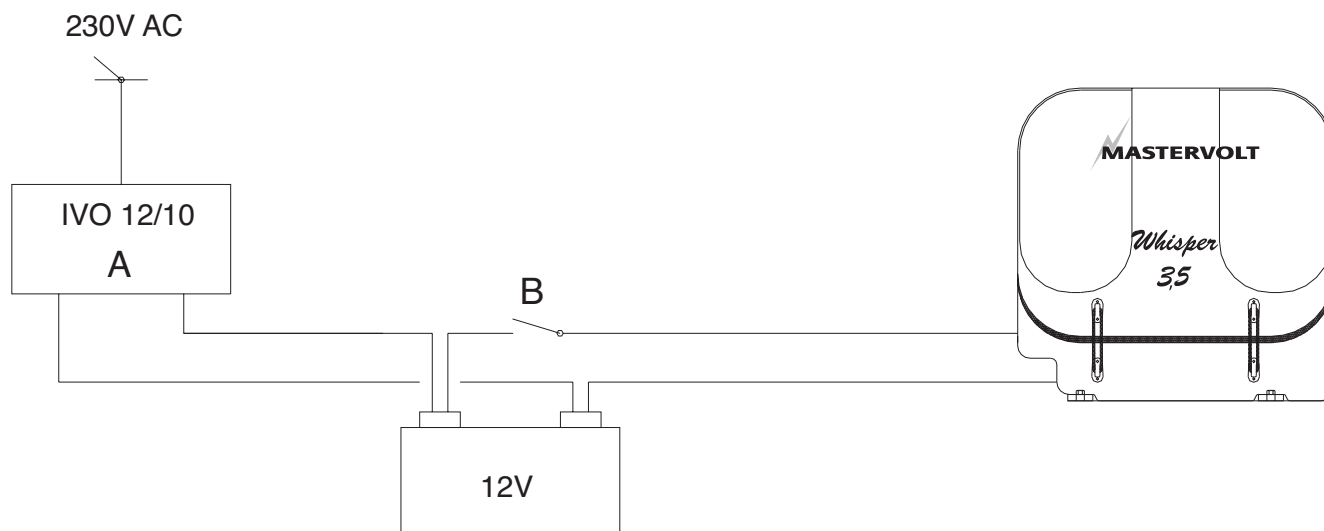


Fig. 11.

ry switch could be applied to switch off the battery.

The battery cables are supplied in a standard length of 5 ft. (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 sever damage to the batteries within a short time.

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



As explosive hydrogen gases are 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 gasses.

1.4.5 AC power system (120 Volt)



Before working (installation) on the system read the sections on safety in the users 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 on-board electrical system is properly installed by a qualified electrician.

1 FUSE

An input fuse (from the generating set to the system) should be installed to protect the installed electrical system. The fuse should be sized such that the rated generating set current is not exceeded. For the Whisper 3,5 the maximum single phase current is 25A for 120V. The fuses must be of the slow reacting type. For electrical motors connected to the system, a motor protection switch must be installed.

2 GROUNDING

In the U.S.A. models the neutral of the AC alternator windings is grounded.

Measures against earth insulation failures have to be taken. An earth insulation failure device has to be installed. The housing of the alternator and all other metal parts are grounded.

Small pleasure craft in Europe 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.



Warnings:

In all situations the transfer switches between shore, inverter and generator should switch both neutral and L1. Of course this is the case when using a Mastervolt Masterswitch.

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 starter 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.

3 CABLE

For the power cable we recommend the use of 3 wire oil resistant cable with a cross sectional area of 3x AWG 12 (4 mm²) for 120V. One wire for earth is included. For very long cables it is recommended to apply cables with a larger cross section than the mentioned above.

4 TRANSFER SWITCH

A power source selector switch much 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 chattering.

Mastervolt advises the installation of a MASTER-SWITCH as the power source selector. This works automatically when the generating set is not running the input remains in the shore position and as soon as the generating set is running the masterswitch switches automatically after 5 seconds delay time over to the generating set position.

2 INSTALLATION SPECIFICATIONS

2.1 WHISPER 3,5 INSTALLATION TABLE

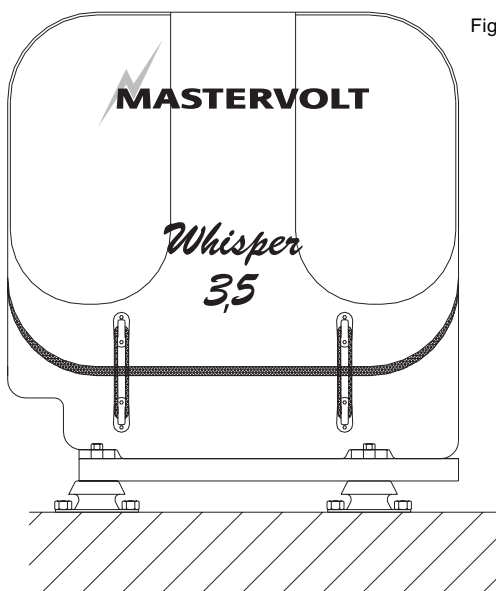


Fig. 12.

- 1 Install a steel foundation plate between ship's hull and generating set, with 4 shock mounts (ref. to fig. 12) 'foundation plate'.
- 2 Mount the generating set directly to the foundation plate.
- 3 Connect the (sea) water inlet to the strainer.
- 4 Connect exhaust system.
- 5 Connect a siphon breaker or 'air vent' into the cooling circuit, if necessary.
- 6 Connect 'fuel supply line' to the water separator/ fuel filter.
- 7 Connect 'fuel return line' to the fuel tank.

- 8 Connect remote panel (just plug in).
- 9 Connect the AC cable from the AC box to the power source selector or masterswitch.
- 10 Connect plus and minus from the 12V starter battery to the battery cables.
- 11 Install a Mastervolt battery charger (optional).

2.2 COMMISSION 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 just above the seawater level.
- 3 Check if the exhaust system is properly installed. Also check the minimum required height of 2 ft. (60 cm above sea level of the exhaust loop (goose neck).
Check maximum length of exhaust hose, diameter of exhaust hose, position waterlock, maximum lift.
- 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 and bleed the fuel system.

- 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.
 (Refer to paragraph 4.2.2 of the users manual)
- 9 Check if the air intake in the canopy is not blocked.
- 10 Check the oil level and color of the oil.
- 11 Preheat the engine by pushing the glow button for ten seconds. Start the engine by pushing the start button until the set is running. Do not push the start button longer than 3 seconds.
- 12 Check when the generating set is running, the delay of 5 to 10 seconds in the power source selector transfer.
- 13 Check voltage and frequency under 'no load' conditions.
- 14 Check voltage and frequency under 'full load' conditions.
- 15 Check if the battery charger of the generating set is working (max. 14.2 Volt).
- 16 Close the sound shield and check the noise level.
- 17 Stop the generating set and check the engine again for leakages of oil, fuel or water.
- Installation checklist available on our website: www.mastervolt.com
 Commissioning form available on our website: www.mastervolt.com

2.3 INSTALLATION SPECIFICATIONS WHISPER 3,5 RPM

TECHNICAL DATA

| | |
|-------------------------------|---|
| Article no | 50900555 |
| Dimensions wxdxh. | 19,88" x 19,69" x 15,94" (505x400x500 mm) |
| Weight | 97 kg including sound shield |
| Max. operation angle | 25° |
| Remote panel 15 m cable: | Digital Diesel Control system |
| Battery capacity min. | 12V, 55 Ah |
| Fuel consumption | 0,18 - 0,37 gph (0,7-1,5 l/hr), load dependent |
| Lift fuel pump | electric driven 12 V DC, max. lift 3 ft. (1 m) |
| Coolin | indirect cooling |
| Cooling pump | raw water Mastervolt self priming impeller pump, PTO driven, type K |
| Minimum water supply | 2-3 gpm. (8-12 l/min) |
| Crank case lube oil capacity, | 1,3 US qts (1.3 litre) + 0.2 oil cooler, total 1,5 US qts (1.5 litre) |
| Alternator | synchronous brushless, maintenance free water cooled |
| Voltage regulation | capacitor |
| Output power | 3,3 kW max, 120V/60 Hz at power factor cos phi =1 |
| Battery charger | extra 12V winding including regulator (6 Amps) |

2.4 SPECIFICATION OF THE ACCESSORIES

| | |
|-----------------------------|---|
| Water scoop | min. 1/2" (recommended 3/4") |
| Inlet valve | min. 1/2" in (recommended 3/4" in) 1/2" out |
| Water strainer | 1/2" in, 1/2" out |
| Air vent | 1/2" |
| Inlet suction hose | 1/2" |
| Fuel filter/water separator | minimum 30 micron |
| Fuel inlet and return | 8 mm |
| Exhaust hose in/out | Ø 1 5/8" (40 mm) |
| Water lock | Ø 1 5/8" (40 mm) |
| Water/gas separator | Ø 1 5/8" (40 mm) |
| Foundation plate | min. 44 kg |
| Battery charger (optional) | IVO smart 12/10; 12V / 10 Amps |
| Optional anti shock mounts | art.no. 50230552 |

2.5 INSTALLATION MATERIALS WHISPER 3,5

WATER INLET KIT 1/2" (13 mm)

| no | qtt | article no | description | dimensions |
|--------------|-----|-----------------|-------------------------------------|------------|
| 1 | 1 | 50230052 | intake strainer | 3/4 |
| 2 | 1 | 50230042 | lever operated ball valve FF | 3/4 |
| 3 | 1 | 50221016 | male hose connection | 3/4x1/2 |
| 4 | 3 | 50221521 | hose clamps | 1/2 - 3/4 |
| 5 | 3 | 50220055 | outboard cooling water hose | 1/2 |
| 6 | 2 | 50221003 | male hose connection | 1/2 |
| 7 | 1 | 50230060 | nickel plated brass intake strainer | 1/2 |
| 8 | 1 | 50230067 | mounting bracket waterstrainer | |
| TOTAL | | 50230201 | WATER INLET KIT 1/2 | |

AIR VENT KIT 1/2" (13 mm)

| no | qtt | article no | description | dimensions |
|--------------|-----|-----------------|-------------------------|------------|
| 11 | 2 | 50221260 | hose connector | 1/2 |
| 4 | 7 | 50221521 | hose clamps | 1/2 - 3/4 |
| 12 | 3 | 50220057 | warm cooling water hose | 1/2 |
| 13 | 2 | 50221082 | elbow 90 gr m/f | 1/2 |
| 6 | 2 | 50221003 | male hose connection | 1/2 |
| 14 | 1 | 50221042 | TEE fittings | 1/2 |
| 15 | 1 | 50230001 | syphon breaker valve | 1/2 |
| 16 | 1 | 50221001 | male hose connection | 3/8x1/2 |
| TOTAL | | 50230202 | AIR VENT KIT 1/2 | |

EXHAUST KIT 1 5/8" (40 mm)

| no | qtt | article no | description | dimensions |
|--------------|-----|-----------------|--|--------------------|
| 21 | 1 | 50221481 | hose connector | 1 5/8 (40 mm) |
| 22 | 5 | 50221506 | hose clamps | 1,5-2,2 (44-56 mm) |
| 23 | 3 | 50220033 | marine exhaust hose | 1 5/8 (40 mm) |
| 24 | 1 | 50230071 | waterlock | 1 5/8 (40 mm) |
| 25 | 1 | 50230038 | brass through hull fitting hose connection | 1 1/4x1 5/8 |
| TOTAL | | 50230203 | EXHAUST KIT 1 5/8 (40 mm) | |

OPTIONAL INSTALLATION MATERIALS

| no | qtt | article no | description | dimensions |
|-----|-----|------------|---------------------------------|---------------|
| 21A | 1 | 50201830 | elbow 90 ° adapter exhaust hose | 1 5/8 (40 mm) |

WATER SEPARATOR KIT 1 5/8 (40 mm)

| no | qtt | article no | description | dimensions |
|--------------|-----|-----------------|--|----------------------------------|
| 22 | 4 | 50221506 | hose clamps | 1,5 - 2,2 inches (44-56 mm) |
| 23 | 2.5 | 50220033 | marine exhaust hose | 1 5/8 (40 mm) |
| 31 | 1 | 50221015 | male hose connection | 1 1/4 x 1 5/8 |
| 32 | 1 | 50230044 | lever operated ball valve FF | 1 1/4 |
| 33 | 1 | 50230033 | brass through hull fitting | 1 1/4x 2,0 |
| 34 | 1 | 50230080 | water exhaust fumes separator | 1 5/8 x 1 5/8 x 1 5/8 (40-40-40) |
| TOTAL | | 50230204 | WATER SEPARATOR KIT 1 5/8 (40 mm) | |

FUEL KIT U.S.A.

| no | qtt | article no | description | dimensions |
|--------------|-----|-----------------|-------------------------------|----------------|
| 42 | 1 | 50230090 | fuel strainer/water separator | M14x1,5 mm |
| 44 | 2 | 50221644 | reducing male nipple | M14-M16 60 gr. |
| 45 | 2 | 50221615 | hose connection | 5/16 (8 mm) |
| 46 | 2 | 50221616 | nut coupling | M16x1,5 mm |
| 48 | 4 | 50221522 | hose clamps | 10-16 mm |
| TOTAL | | 50230206 | FUEL KIT U.S.A. | |

OPTIONAL INSTALLATION MATERIALS

| no | qtt | article no | description | dimensions |
|----|---------|------------|-------------|-----------------|
| 49 | p/ft(m) | 50220063 | fuel hose | 5/16" (8x16 mm) |

BATTERY INSTALLATION KIT

| no | qtt | article no | description | dimensions |
|--------------|-----|------------------|---------------------------------|------------|
| 51 | 1 | 64000550 | battery | 55Ah |
| 52 | 1 | 43011030 | battery charger IVO smart 12/10 | |
| 53 | 1 | 68060100 | battery terminal + | M8 |
| 54 | 1 | 68060200 | battery terminal - | M8 |
| 55 | 1 | 68456902 | isolation cap | |
| 56 | 1 | 68456914 | isolation cap | |
| 57 | 1 | 79009005 | battery swich | 250 Amp |
| 58 | 4 | 6503001608 | cable connectors | M8x16 |
| TOTAL | | 050230206 | BATTERY INSTALLATION KIT | |

BASE PLATE KIT

| no | qtt | article no | description | dimensions |
|--------------|-----|-----------------|-------------------------|------------|
| 61 | 4 | 50230052 | rubber mountings | M12 |
| 62 | 1 | 50230012 | base plate Whisper 3,5 | |
| 63 | 1 | 50230011 | fastener kit base plate | |
| TOTAL | | 50230207 | BASE PLATE KIT | |

- fuel kit
- battery installation kit
- base plate kit

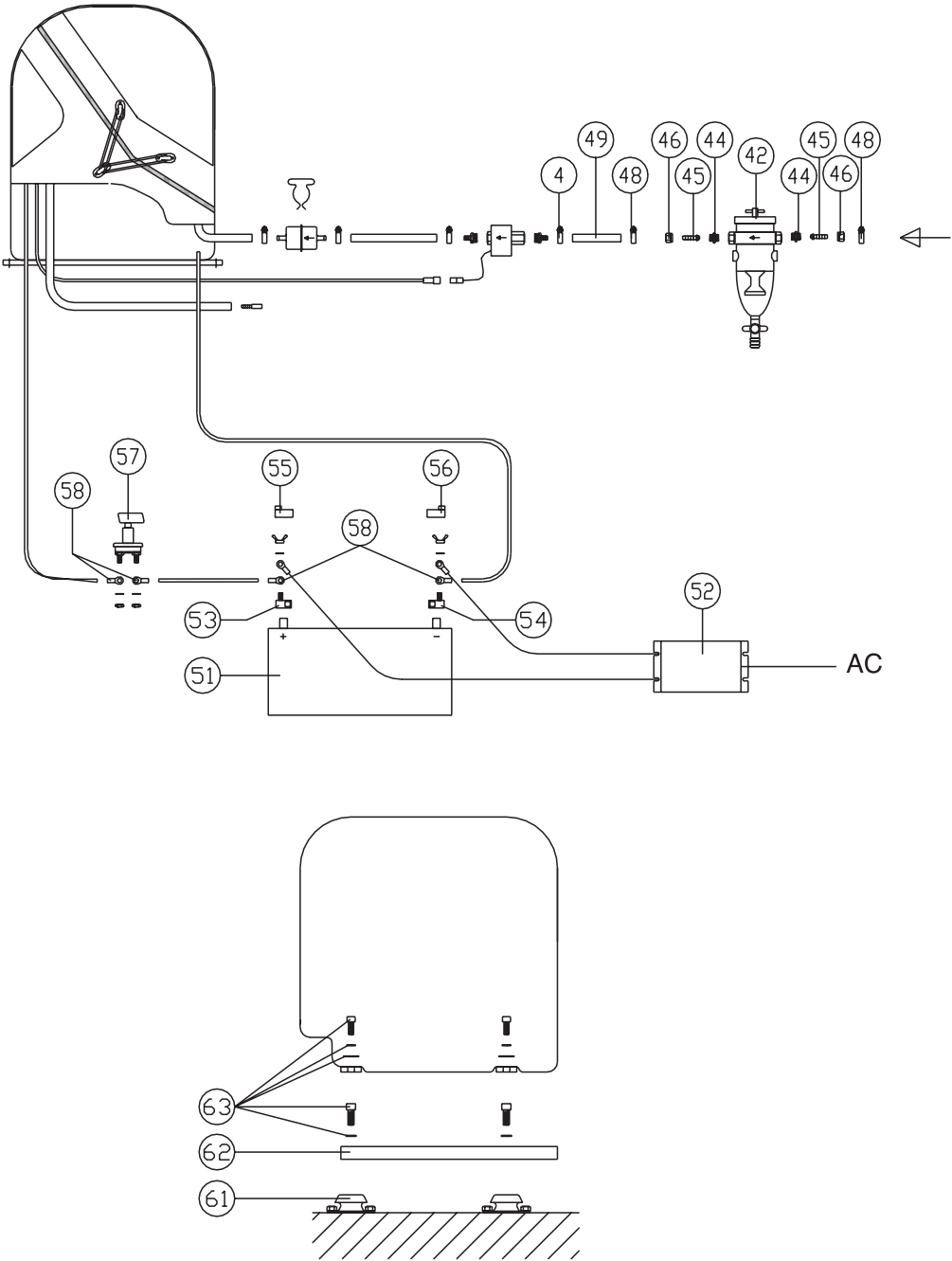
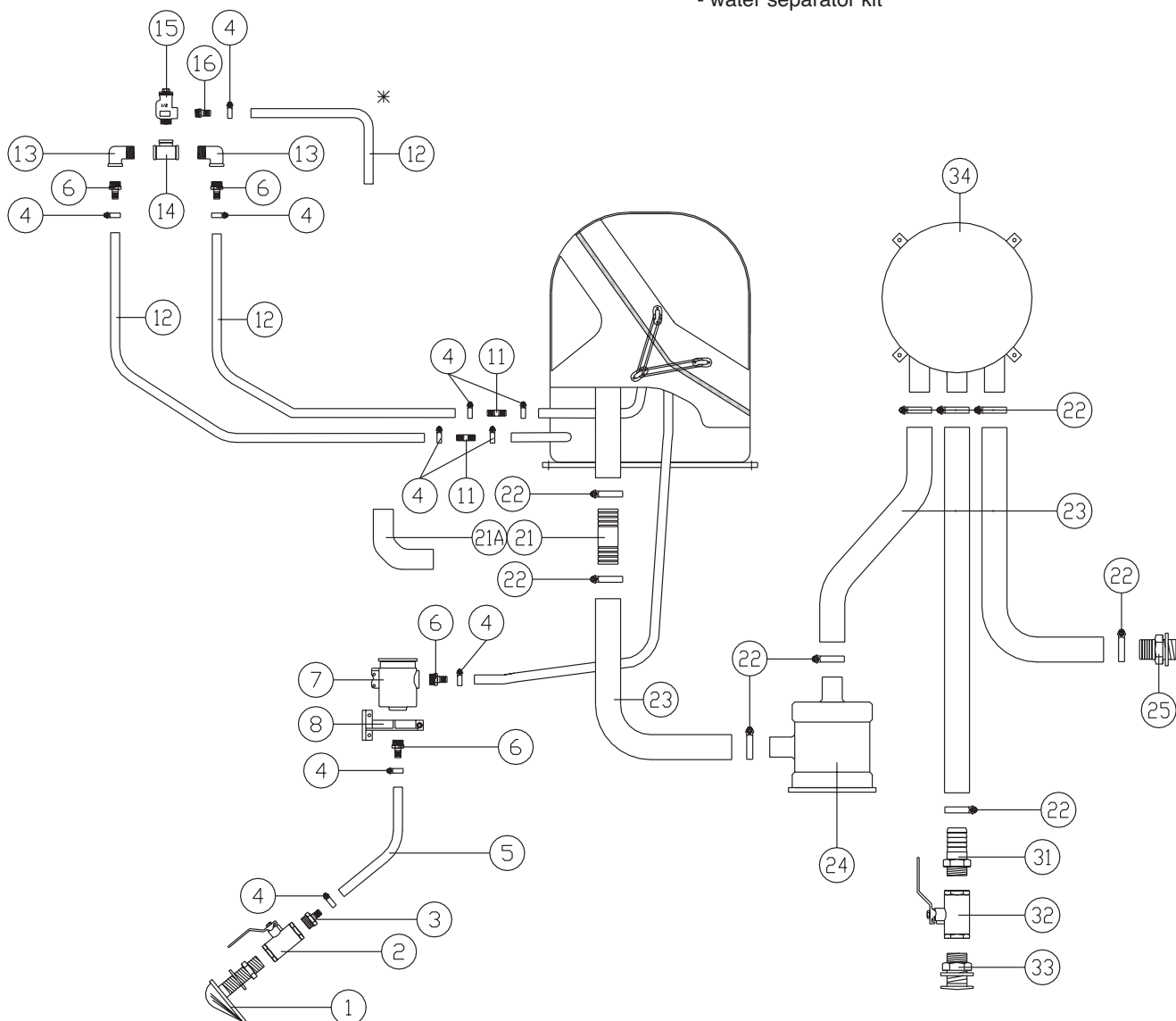


Fig. 14.

- water inlet kit
- air vent kit
- exhaust kit
- water separator kit



* Hose drain should go downwards. Water must flow out freely. Refer to installation manual for proper installation of the air vent kit.
Faulty installation can cause serious damage.

Fig. 15.

3 DIAGRAMS & DRAWINGS

3.1 DC WIRING DIAGRAM

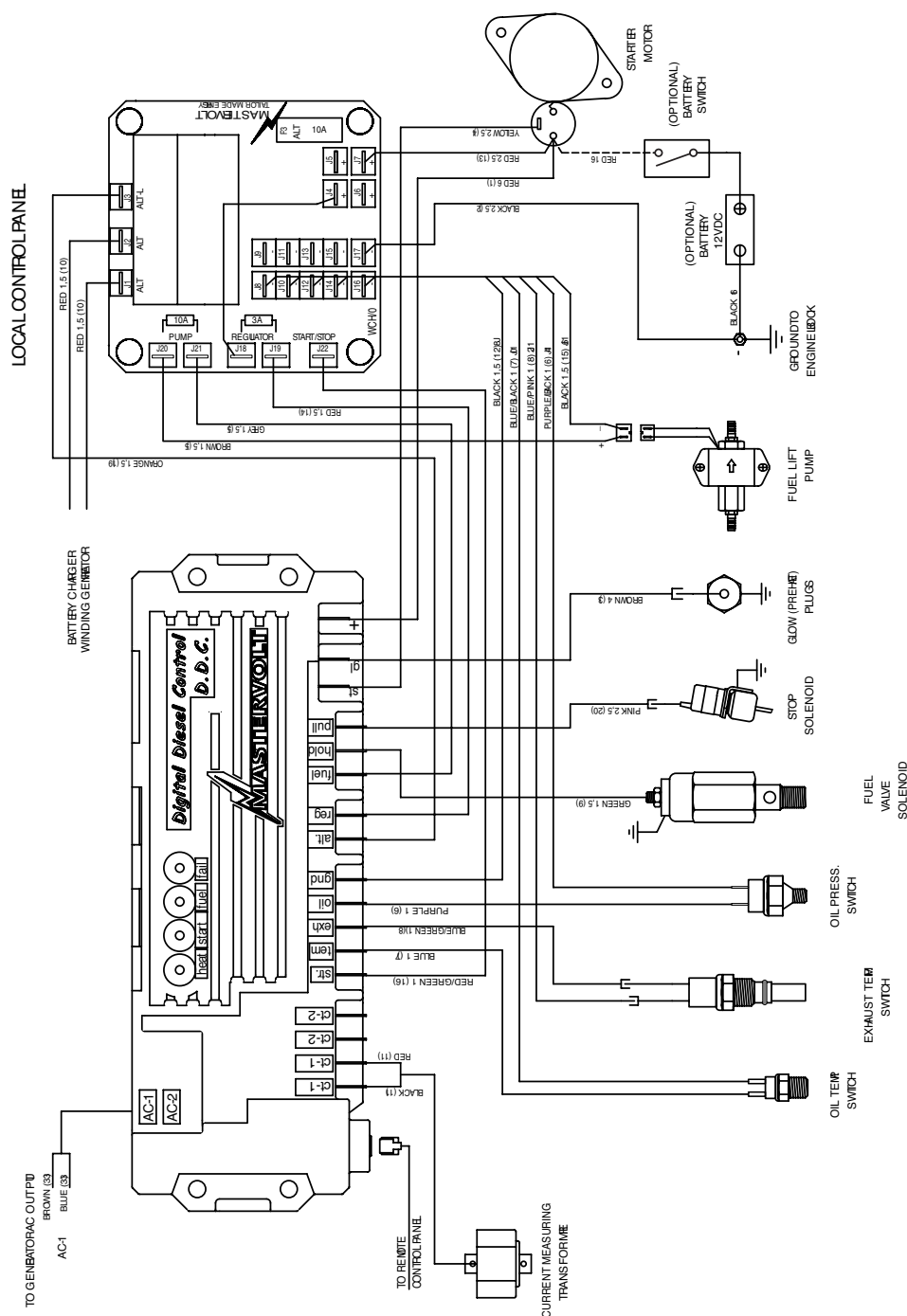


Fig. 16.

GENERATING SET:

- | | |
|------------------------|--------------------------------|
| 1 Fuse 1; | 8 Fuel pump; |
| 2 Fuse 2; | 9 Oil temperature switch; |
| 3 Contact relay; | 10 Exhaust temperature switch; |
| 4 Start relay; | 11 Oil pressure switch; |
| 5 Preheat relay; | 12 Current transformer; |
| 6 Fuel shut off valve; | 13 Glow plug; |
| 7 Starter motor; | 14 Connector remote control. |

3.2 CODES AND COLORS

AWG (American Wire Gauge)

| | Cable code number | colour | AWG | cross section |
|---|-------------------|--------------|-----|---------------------|
| battery > starter motor | | red | 4 | 16 mm ² |
| starter motor > DCC | 1 | red | 10 | 6 mm ² |
| starter motor > LCP | 13 | red | 14 | 2,5 mm ² |
| battery > ground | | black | 4 | 16 mm ² |
| ground > LCP ground (GND) | 2 | black | 14 | 2,5 mm ² |
| DDC > glow plug | 3 | brown | 4 | 4 mm ² |
| DDC > starter solenoid | 4 | yellow | 14 | 2,5 mm ² |
| LCP > fuel lift pump + | 5 | brown | 16 | 1,5 mm ² |
| LCP > fuel lift pump - | 15 | black | 16 | 1,5 mm ² |
| DDC > LCD | 5 | grey | 16 | 1,5 mm ² |
| DDC > oil pressure switch | 6 | purple | 17 | 1 mm ² |
| LCP > oil pressure switch | 6 | purple/black | 17 | 1 mm ² |
| DDC > oil temperature switch | 7 | blue | 17 | 1 mm ² |
| LCP > oil temperature switch | 7 | blue/black | 17 | 1 mm ² |
| DDC > exhaust temperature switch | 8 | blue/green | 17 | 1 mm ² |
| LCP > exhaust temperature switch | 8 | blue/rose | 17 | 1 mm ² |
| DCC > fuel valve solenoid | 9 | green | 16 | 1,5 mm ² |
| DCC > stop solenoid | 20 | pink | 14 | 2,5 mm ² |
| DCC > current measuring transformer | 11 | black | 17 | 1 mm ² |
| DCC > current measuring transformer | 11 | red | 17 | 1 mm ² |
| DCC > LCP | 19 | orange | 16 | 1,5 mm ² |
| DCC > LCP | 12 | black | 16 | 1,5 mm ² |
| DCC > LCP | 14 | red | 16 | 1,5 mm ² |
| DCC > LCP | 16 | red/green | 16 | 1,5 mm ² |
| DCC > generator AC output | 33 | brown | 17 | 1 mm ² |
| DCC > generator AC output | 33 | blue | 17 | 1 mm ² |
| LCP > battery charger winding generator | 10 | red | 17 | 1 mm ² |
| LCP > battery charger winding generator | 10 | red | 17 | 1 mm ² |

DDC=Digital Diesel Control Unit

LCP=Local Control Panel

Fig. 17.

3.3 AC WIRING DIAGRAM 120V / 60 HZ

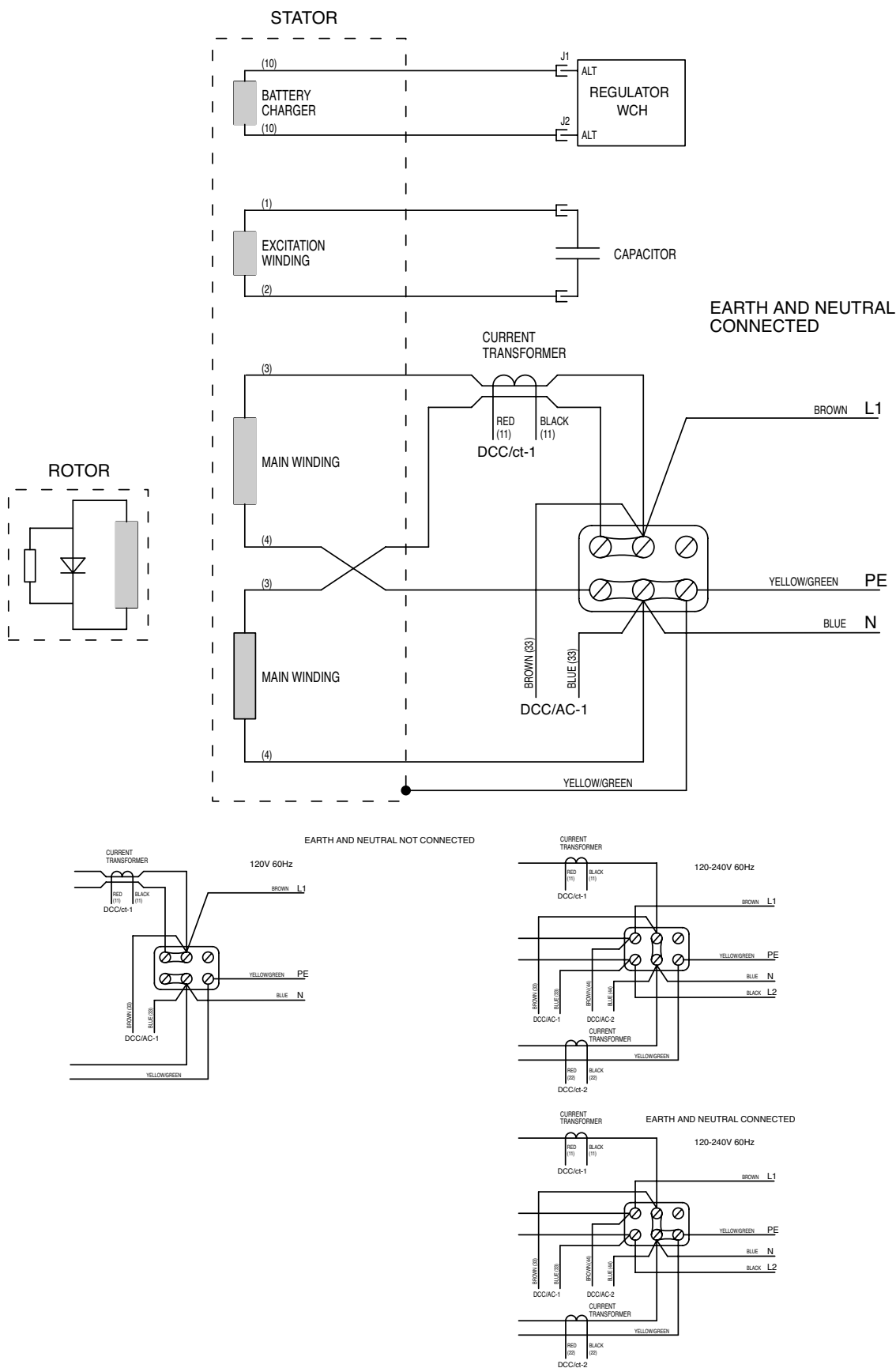
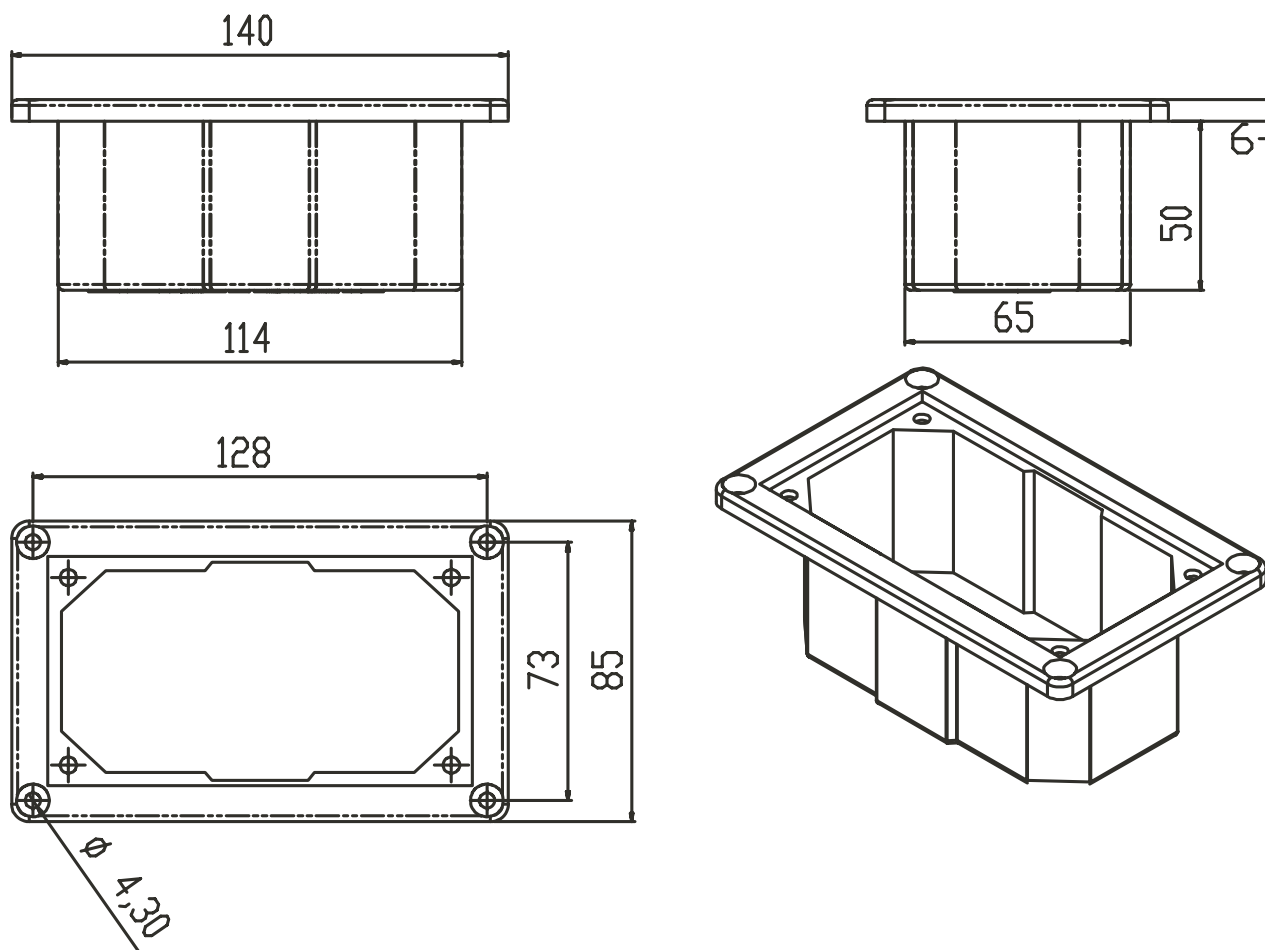


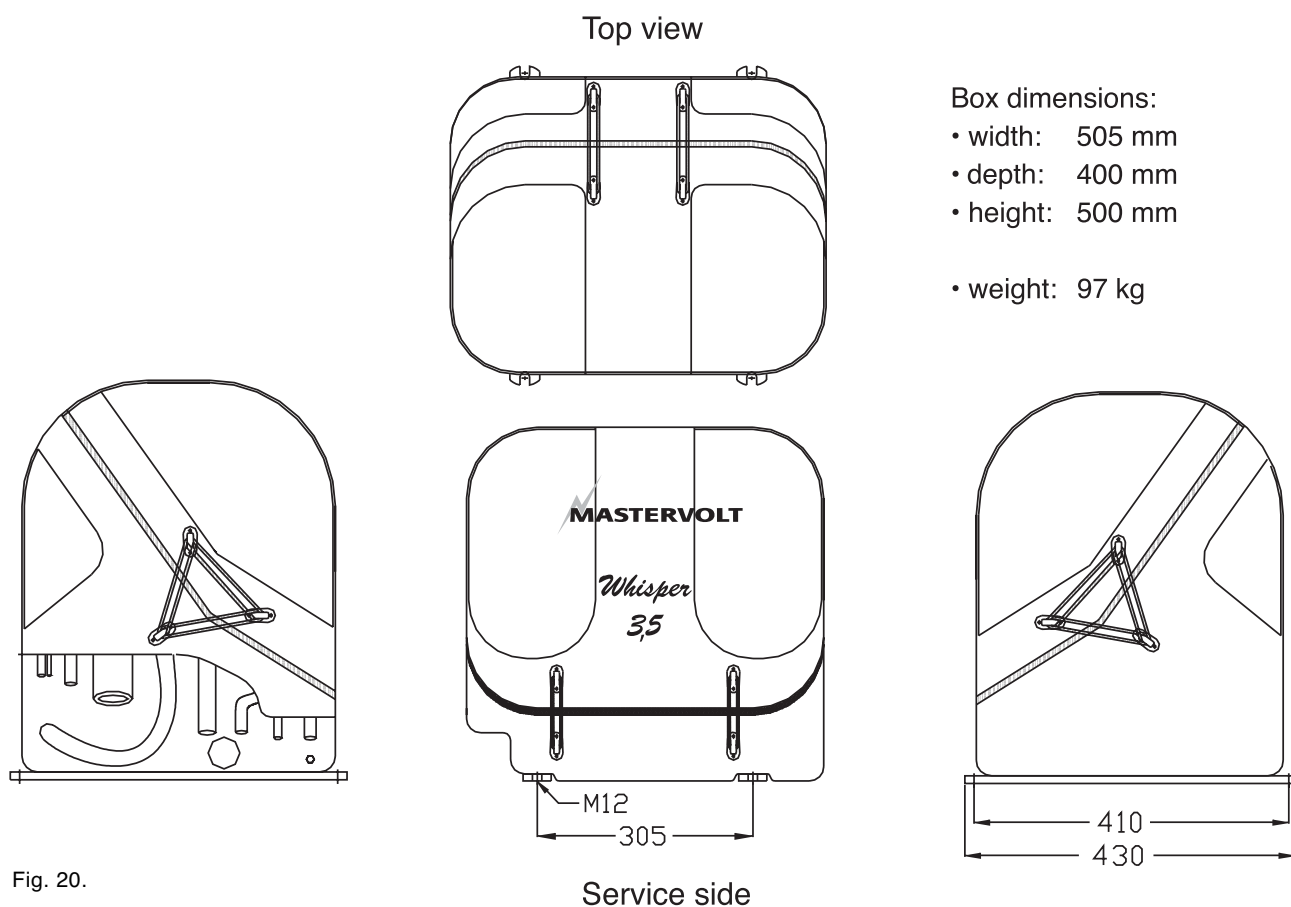
Fig. 19.

3.4 REMOTE CONTROL PANEL DRAWINGS



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

3.5 WHISPER 3,5 DIMENSION



CONNECTIONS:

- exhaust: 1 5/8" (40 mm)
- fuel hose: 5/16" (8 mm)
- sea water in: 1/2" (12,5 mm)
- air vent connection: 1/2" (12,5 mm)
- battery +: AWG 4 (16 mm²)
- battery -: AWG 4 (16 mm²)
- cables: 3x AWG 12 (3x 4mm²)
15 ft. (5 meter)
- remote control: 15 m. (45 ft.) 8 wire twisted
communication cable
(included)



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