INSTALLATION MANUAL FOR MOBILE APPLICATIONS

GENVERTER W-GV 4

Variable speed: 2500-3400 RPM
230V / 50Hz
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1 INTRODUCTION

1.1 USE OF THIS MANUAL

This manual serves as a guideline for the safe and effective installation of the Genverter W-GV4 basic for mobile applications.

It is obligatory that every person who is involved with the installation of the W-GV4 must be completely familiar with the contents of this manual, and that he/she carefully follows the instructions contained herein.

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 only by qualified, authorized and trained personnel, consistent with the locally applicable standards and taking into consideration the safety guidelines and measures (chapter 2 of the user’s manual).

The information, specifications, illustrations and statements contained within this publication are given with our best intentions and are believed to be correct at the time of going to press.

Our policy is one of continued development and we reserve the right to amend any technical information without prior notice.

Whilst every effort is made to ensure the accuracy of the particulars contained within this publication neither the manufacturer, distributor, or dealer in any circumstances shall be held liable for any inaccuracy or the consequences thereof.

Keep this manual at a secure place!

1.2 VALIDITY OF THIS MANUAL

All of the specifications, provisions and instructions contained in this manual apply solely to standard versions of the GV4 delivered by Whisper Power.

This manual is valid for the following models:

<table>
<thead>
<tr>
<th>Part number</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>41002000</td>
<td>W-GV4 50 Hz 230V variable speed</td>
</tr>
</tbody>
</table>

Refer to the user’s manual for identification of the generator set. For other models see our website: www.whisperpower.eu.

During installation and commissioning of the genverter, the Safety Guidelines & Measures are applicable at all times. See chapter 2 of the user’s manual.

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 section safety instructions in the user’s manual.

1.3 INSTALLATION PARTS

Besides the parts that are included with the delivery you need at least the parts listed at section 4.4 to install the genverter. Please note that this listing may not be complete, as every installation differs from the other. Oil is not included in the supply. Refer to the users manual for the right specifications.

1.4 CHP: COMBINED HEAT POWER GENERATION

The optimum engine operating temperature is between 80° and 110° Celsius. The outgoing oil temperature is about 90° up to 110°C. The radiator reduces the temperature of the cooling liquid by 20°C to 25°C. The returning “cold” oil therefore has a minimum temperature of approx. 65°C Celsius.

This means that the hot oil can be used for heating up water or any other medium to almost 100°C to use the heat from the engine for other purposes. This can be done with an additional heat exchanger. Also it could be useful to use the hot air of the radiator for heating purposes. Whisper Power can advice on this applications and supply additional installation parts for CHP.
1.5 GENERATING SETS FOR VEHICLES

On vehicles the engine is cooled by radiator with an electric (12V) driven fan. Standard the oil cooler radiator is in the canopy for mounting the genverter below the vehicle in the open air.

When the Genverter is mounted inside the vehicle the radiator should be blow out air through the wall, (Figure 1)
When this is not possible the radiator can better be mounted outside the canopy and outside the vehicle. This can be in the side, below or on top or of the vehicle.

The exhaust is of the dry type and includes a stainless flexible bellow and high quality mufflers.
Also the exhaust can be inside, below or on top of the vehicle.

IT IS VERY IMPORTANT TO EVALUATE ALL PRO’S AND CON’T’S BEFORE MAKING A CHOICE HOW TO SET UP THE INSTALLATION.

Figure 1: Vehicle application radiator inside the canopy blows air out through the side.

Figure 3: Vehicle application radiator mounted below the vehicle.

Figure 2: Vehicle application radiator mounted in the side.

Figure 4: Vehicle application radiator mounted on the roof of the vehicle.
2 INSTALLATION

2.1 GENERAL
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.

2.2 LOCATION
When looking for a proper place for a genverter in a vehicle all relevant aspects have to be taken into account
- Accessibility
- Solid foundation
- Space to mount the radiator (refer to 2.8)
- Space to mount the exhaust (refer to 2.9)
- A route to fit the fuel lines
- The air flow through the genset (refer to 2.6)

Since the Whisper Genverters 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 genverter, make sure there is sufficient room to carry out any maintenance work. The unit must be easily accessible on the service side.

All models can be serviced from one side. Oil filling can be done on the service side and on the top. (The top of the engine (rocker cover) has to be accessible for adjustment of the valve clearance.

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

2.3 PROTECTION AGAINST DIRT, SAND AND BAD WEATHER CONDITIONS.
The unit can be mounted below a vehicle. However, be aware of the bad conditions below a truck when driving in rain or snow. Also prevent the unit for a spray of water and or mud behind the wheels. In some territories there is sand in the air. When the conditions are very bad one could remove the inverter unit from the canopy and position this in a more dry and safe place. The air inlet of the engine compartment can be protected by and air inlet strainer.

2.4 INSTRUCTIONS FOR OPTIMAL SOUND AND VIBRATION INSULATION
Position the generating set as low as possible in the vehicle. The generating set is secured to the base frame inside the canopy by means of a double flexible engine mountings system. This frame is must be solidly mounted in the vehicle. (Not using rubber mountings again) When it is possible to mount the unit directly on the chassis of the vehicle this has advantages in preventing vibrations by resonance.

2.4.1 Further recommendations
Whisper generating sets are standard equipped with a sound cover canopy. 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 Genverter is placed to be stiff. Directly below the base frame the structure should be supported vertically to the chassis of the vehicle. When this is not possible horizontal structures should be made stiff by additional provisions. (refer to fig. 5)

2. In larger vehicles a separate and insulated space for the genverter will help to damp the noise even further

3. Avoid mounting the generating set in close proximity to thin walls or floors that may cause resonance.

4. 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.

5. Never connect the base of the generating set directly to walls or tanks. (refer to fig. 5)


2.5 VENTILATION

2.5.1 General

When not in the open air below a truck, the generator normally draws air from the engine compartment. An engine compartment with natural ventilation must have vent openings of adequate size and location to enable the generator to operate without overheating. To allow an ample supply of air within the temperature limits of the generating set an opening of at least 900 cm² is required. A "sealed" engine compartment must have a good extraction ventilator to maintain reasonable ambient 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. At higher temperatures the electric output will be lower. To minimise 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 compartment to clear fumes from the bottom and to circulate fresh air. Air outlets should be at the top of the engine compartment to remove the hottest air. An engine compartment 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 compartment 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 rain and water spray.
2.6 CONNECTIONS

The generating set comes with all supply lines and output cables (i.e. electric cables, exhaust pipe, 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 figures 6. 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 section safety instructions.

1 Air flow
2 Exhaust hose
3 Fuel in Ø8mm
4 Fuel out Ø8mm
5 AC cable
6 Remote cable
7 Cable fuel lift pump
8 Battery cables
9

Figure 6: Generator connections of the GV-4
2.7 FUEL SUPPLY

2.7.1 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; connections are to be made at the top of the tank with internal tubing down to a few cm above the bottom of the tank. Using the existing fuel tank of the car-engine the fitting should be carried out with extra care. Both a supply line and a return line should be installed and go into the tank from the top. Interference of the two systems (car engine and genverter engine) should be avoided.

Driving the tank empty below the level of the suction pipe of the genverter could make it necessary to bleed the fuel system.

Using the tank empty below the level of the suction pipe of the genverter could make it necessary to bleed the fuel system.

Do NOT connect the fuel lines to the lines of the vehicle's engine fuel supply.

2.7.2 Fuel lift pump
The generating set itself is equipped with a separate fuel lift pump; therefore the tank can be installed at a lower level than the generating set. See figure 7. 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. When using a second electric fuel supply pump, it is recommended to mount a loose supplied pump close to the tank and mount it in an angle or vertical to prevent air bubbles to block the system. The pump makes clicking noises and therefore could be mounted on rubber mountings.

When the clicking noises of the pump are not acceptable an other noiseless pump is available as an option (Art. No. 50202200).

Figure 7: Fuel supply (fuel tank is below the generating set)

Figure 8: Fuel supply (fuel tank is above the generating set)
2.7.3 Fuel pipes

When the tank is above the generating set (figure 8) 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 (figure 7) 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. 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. The return line should be of 8 mm diameter and go straight back via the top to the bottom of the tank. When the return is too narrow, has too many bents and goes back to the bottom of the fuel tank, the back-pressure could be too high. This results in irregular running of the engine. When the engine runs irregular, one can check if back-pressure is the problem by disconnecting the return line just outside the canopy and draining it in a canister. When the engine runs smooth now, the return piping has to be changed. It could also help to install a second (electrical 12V) fuel lift pump in the supply line to increase the pressure.

2.7.4 Fuel filters

A fine fuel filter is installed which requires maintenance. Whisper Power 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.

2.8 RADIATOR COOLING

2.8.1 General instructions

The radiators can be mounted below the floor, in the side or on the roof of the vehicle. It is recommended to keep the radiators as close as possible to the unit. The piping should be fitted as direct as possible.

It is very important to use good quality heat and pressure resistant hose and fittings. Therefore it is strongly advised to use Whisper Power installation kits from Whisper Power.

2.8.2 How and where to mount the radiator

The radiator kit includes rubber mountings to prevent vibrations to be transferred to the body of the vehicle. Due to the difference between vehicles general instructions are not available. One has to find out where the best place for mounting is. For OEM customers Whisper Power can supply a special customised installation kit.

2.8.3 Bottom mounted radiator

When bottom mounted the radiator should not be the lowest point of the vehicle to avoid damage. A free flow of air should be guaranteed. When horizontal mounted, the fan should be on top, which causes a flow of air downwards. Often it is possible to find a place where extra space above the fan helps to create a free flow of air. It is recommended to make a shield below the radiator to catch stones and dirt and operates as a spoiler. The distance between the radiator and the shield should be at least 50 mm. Sometimes it is possible to build the radiators and shield on a sub frame that is mounted below the vehicle as a module.

MEASURES HAVE TO BE TAKEN TO PREVENT THE HOT AIR CIRCULATING
AND REDUCING THE CAPACITY OF THE RADIATORS.

Figure 10: Bottom mounted radiators with shield

2.8.4 Side mounted radiators
Most effective and easy is to mount the radiator in the side of the vehicle, if possible below the level of the top of the engine. A louvered grid should protect the radiator from rain and objects, but must not block the airflow. The fan should be inwards which causes the air to blow outwards. A disadvantage of having the radiator in the side is possibly more noise of the electric fan and a flow of air that could be felt by people passing by. A free flow of air should be guaranteed.

Figure 11: Side mounted radiator

2.8.5 Roof mounted radiators
The radiator on the roof is often the best option from the point of view of keeping the noise of the fan away from people and it will give the best result in dissipating the heat. However, often this option conflicts with the possible need to keep the vehicle as low as possible. An other disadvantage is that the piping has to go through the roof which requires provisions to be waterproof. When having the radiators horizontally mounted on the roof (refer to figure 24) enough space (50 mm) should be between the roof and the radiator fan to have a free flow of air. When the radiator is roof mounted there should be protection against weather conditions. To avoid damage while the vehicle is driving at high speed, the use of a spoiler could be necessary.

Figure 12: Two examples of top mount radiators

2.9 DRY EXHAUST SYSTEM
2.9.1 General remarks
A dry exhaust muffler system should be very effective in silencing the exhaust when applying the right mufflers. However noise could be generated by vibrations in the mufflers and be transferred to the chassis. Tacit factors like the length of specific pipe sections could cause the noise to be amplified. It is very difficult to take these factors into account.

Figure 13: Dry exhaust systems on vehicles

The standard Whisper Power exhaust kit contains the materials to perform a professional installation. In the kit is a stainless steel flexible bellow (hose) to allow for expansion and to prevent vibrations to be transferred. Rubbers are supplied to mount the mufflers flexible. The insulation jackets for the flexible bellow and the resonance muffler are also very effective in damping vibrations. Still it could be that additional measures has to be taken like an extra clamp in a vibrating section of pipe, insulation blankets on other parts of the system and possibly even additional mufflers.

\[\text{WHEN THE EXHAUST IS LED THROUGH THE ROOF OF A VEHICLE, MEASURES HAS TO BE TAKEN TO PREVENT RAINWATER TO ENTER THE SYSTEM. SPECIAL RAIN CAPS ARE AVAILABLE AS AN OPTION.}\]
A negative feature of a dry exhaust system is the heat radiated by its components. When a dry exhaust has its outlet on the roof, all the pipes inside the vehicle has to be insulated.

The exhaust pipes will be very hot and all accessible pipes and mufflers are dangerous to people when not insulated.

There are companies that are specialised in insulating hot pipes and fancy systems are available to make it good looking. However it is also possible to do it yourself by winding fibreglass or Rockwool around the pipes and seal it with aluminium tape.

### 2.9.2 The standard dry exhaust system

The standard exhaust system contains:

- An insulated exhaust bent

In the exhaust installation kit:

- A stainless steel shielded flexible bellow.
- One resonance muffler
- One absorption muffler
- Clamps and rubbers to mount the system flexible
- Fittings, bents and pipes to make the different connections
- Blankets for thermal and sound insulation.

The mufflers are high quality industrial mufflers that are much more effective, robust and durable than mufflers made for automotive use.

### 2.9.3 Installation of the exhaust

Before determining the location of the genverter one has to consider how to get away with the exhaust. Often one can find space below the vehicle between the chassis to mount the mufflers. The outlet should blow the fumes away from the doors to avoid a nasty smell. When the gasses are in the flow of air blowing from the radiators this will help to avoid the fumes to be noticed. Under no condition the fumes should be sucked into the flow of air into the radiators. In wind still conditions a light smell of exhaust fumes around the vehicle will not be avoidable.

To bring the exhaust to the top of the vehicle gives the best results on noise and smell. However, when the pipes go through the vehicle they should be insulated and around the hole in the roof should be a collar to prevent rainwater to leak in. Both mufflers could be on the roof or one of them or both could be below the vehicle.

In general it is better to have the mufflers wide apart: the resonance muffler close to the genverter and the absorption muffler on the end of the line; preferably 1m pipe in between. A short pipe (30cm) should be on the far end after the absorption muffler. The absorption muffler has no flow direction and could be mounted both ways. The resonance muffler should be mounted according to the indication on the muffler itself.

The resonance muffler should be fitted according to direction of the gas flow indicated.

In the kit are clamps to mount the exhaust pipes to stainless steel bars. These bars should be mounted to the chassis of the vehicle. It is recommend to use rubber mountings whenever possible. However take care that the heat conducted through the brackets will not affect the rubber. Refer to figure 15 how to mount the rubber in a safe way. When any doubt an extra safe guard could be constructed from steel wire or chain.

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*Figure 14: Ways to prevent water to get in*

*Figure 15: Mounting bracket in rubber with safe guard*
3 ELECTRICAL INSTALLATION (12 VOLT)

3.1 DIGITAL DIESEL CONTROL SYSTEM

The electrical control system is standard in 12 Volt with negative earth. Non-earth return is available as an option.

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. A local control panel is on the generating set.

3.2 REMOTE CONTROL

A remote control panel also containing a microprocessor is in the delivery. A 10 m intermediate 8-pole communication cable is in the standard supply as well (refer to fig. 16). If necessary other lengths are available on request. A longer (up to 30m) intermediate cable can be connected if the standard length does not suit the required distance. When a longer distance than 30m is required, consult the Whisper Power service department for advice.

One can mount the control panel after drilling a hole in the dashboard using the plastic cover. Refer to the dimensional drawings in chapter 5.

Two 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.

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. 16.

3.3 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 fig. 17.

3.3.1 Connection for emergency stop / fire alarm switch

To connect an emergency stop button or to stop the generator automatically in case of a fire alarm, you can use the bypass connection between fastons J4 and J5 on the backside of the local control panel. See fig. 18. To do so, remove this bypass connection and then replace it.
3.4 AUTOMATIC STARTING AND STOPPING

Whisper Power 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.

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. 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 one want to apply other settings than the factory settings refer to the DDC users manual, especially to the APPENDIX.

3.5 STARTER BATTERY

For starting, the GV4 requires a 12V starter battery with at least 55 Ah.

The GV4 can be connected with the main engine battery or have its own battery.

We strongly recommend the use of a separate battery for the GV4 and to keep the wiring system for the boat engine and the domestic DC supply system completely separate and individually connected to separate batteries.

However, the negative of all the batteries on the vehicle 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 vehicles having the starter battery of the vehicle 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 Whisper Power which is able to charge both the vehicle's
main battery and the starter battery. Also a small charger can be used to charge the starter battery only.

3.6 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, fiberglass 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 gasses.

3.7 AC POWER SYSTEM (230 VOLT)

The electric power supplied by the generator is of a high voltage and dangerous to people. Before working (installation) on the system read the sections on safety in the users manual.

Realise hat people are not used to have 230V available on a vehicle. Put warning signs on wall sockets and on junction boxes. Instruct non-regular users of the vehicle. Warn maintenance personal of garages that do service on the vehicle.

Generators used on vehicles that are operated in a hazardous environment have often to fulfill special regulations and additional measures have to be taken accordingly.

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 vehicle’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.

3.8 FUSE

An output fuse (between the GV4 and the electrical installation) should be installed to protect the installed electrical system. A maximum single phase output current applies is 18 Amps.

The fuse must be of the slow reacting type. For electrical motors connected to the system, a motor protection switch must be installed

3.9 GROUNDING

The AC alternator windings are not grounded.

The housing of the alternator and all other metal parts are grounded

It could be necessary that the electric installation in the vehicle must be protected against insulation failures. Methods of protection are subjected to rules that can be different depending on the use of the vehicle and local standards. Experts in this field should be consulted.

To make a connection between “neutral” and “ground” is necessary as part of a specific insulation failure protection system. In the GV 4 this connection is NOT made in the factory. Do not make this connection without installing this specific insulation protection system!

3.10 CABLE

For the power cable we recommend the use of 3 wire single 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)
3.11 TRANSFER SWITCH

A power source selector switch much be installed between the generating set and the vehicle’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 “land” (grid) power systems separate.

Transfer switches - to switch over from a land line to vehicle 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.

Whisper Power recommends the installation of a Systemswitch as the power source selector. This works automatically when the generating set is not running the input remains in the land line position and as soon as the generating set is running the Systemswitch switches automatically after 10 seconds delay time over to the generating set position.

In all situations the transfer switches between land line, inverter and genverter should switch both neutral and L1.

4 INSTALLATION SPECIFICATIONS

4.1 GENERAL

1. Mount the generating set directly, without additional vibration dampers, on a solid surface.
2. When a separate cooling system is applied, mount the cooling system for the engine.
3. Connect exhaust system.
5. Connect ‘fuel return line’ to the fuel tank.
6. Connect remote panel (just plug in).
7. Connect the AC cable from the AC box to the power source selector.
8. Connect plus and minus from the 12V starter battery to the battery cables.
9. When applied, connect the power supply of the (external) radiator
10. Install a Whisper Power battery charger. (optional)

4.2 COMMISSION TABLE

1. Check if the air inlet is sufficient.
2. Check if the cooling system for the engine is properly installed. When the internal radiator is used ; check if the air flow is not blocked and that no hot air is sucked back into the sound shield.
3. Check if the exhaust system is properly installed. Check maximum length of exhaust hose, diameter of exhaust piping.
4. Check all coolant 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. Check the oil level and colour of the oil.
10. To bleed the fuel system:
11. Push the “Start” button on the local control (not on the remote panel) and hold at least 5 seconds and as long as necessary to bleed the system.
12. Check when the generating set is running, the delay of some seconds in the power source selector transfer.
13. Check voltage and frequency under ‘no load’ conditions.
14. Check if the genverter increase speed when loaded more. Check if the genverter can bring the full load.
15. Check if the genverter can speed up when largest load step that can occur comes in. If not increase no load speed (Refer to DDC manual)
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 genverter and check the engine again for leakages of oil, fuel or coolant and check the oil level again.

Installation checklist available on our website: www.whisperpower.eu.
Commissioning form available on our website: www.whisperpower.eu.
### 4.3 TECHNICAL DATA

#### GENERAL

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>W-GV4</td>
</tr>
<tr>
<td>RPM</td>
<td>2500 up to 3400</td>
</tr>
<tr>
<td>Intermittent Power</td>
<td>3.8 kW 230V 50Hz at 3400 rpm</td>
</tr>
<tr>
<td>Continuous Power</td>
<td>3 kW 230V 50Hz at 3000 rpm</td>
</tr>
<tr>
<td>Max surge current 5 seconds</td>
<td>36 l/s</td>
</tr>
</tbody>
</table>

#### ENGINE

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
<td>Whisper Power; direct injected, oil cooled diesel engine. WP 1</td>
</tr>
<tr>
<td>Number of cylinders</td>
<td>1</td>
</tr>
<tr>
<td>Displacement</td>
<td>306 cc</td>
</tr>
<tr>
<td>Bore x stroke</td>
<td>78x64 mm</td>
</tr>
<tr>
<td>Combustion air consumption</td>
<td>0.42 m³/min.</td>
</tr>
<tr>
<td>Intermittent power engine</td>
<td>4.4 kW at 3400 rpm (SAE J1349, ISO 3046/1) (Ambient temperature 25°C; Atmospheric Pressure 100kPa, Rel. humidity 30%)</td>
</tr>
<tr>
<td>Continuous power engine</td>
<td>3.5 kW at 3000 rpm</td>
</tr>
<tr>
<td>Fuel temperature</td>
<td>Max 40°C At fuel injection pump</td>
</tr>
<tr>
<td>Fuel consumption</td>
<td>0.8-1.2 litre/hour, load dependent</td>
</tr>
<tr>
<td>Fuel lift pump engine</td>
<td>Electric pump (12 V DC); additional pump available upon request</td>
</tr>
<tr>
<td>Cooling system</td>
<td>Oil cooled by means of dedicated trochoid pump on the engine and radiator.</td>
</tr>
<tr>
<td>Lubrication system</td>
<td>Forced lubrication with dedicated trochoid pump (different from cooling pump)</td>
</tr>
<tr>
<td>Starting battery (optional)</td>
<td>55-90 Ah 12V</td>
</tr>
<tr>
<td>Starting system</td>
<td>Starter motor</td>
</tr>
<tr>
<td>Control</td>
<td>Digital Diesel Control including automatic start/stop</td>
</tr>
</tbody>
</table>

#### ALTERNATOR

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Type</td>
<td>Permanent Magnet integrated in flywheel</td>
</tr>
<tr>
<td>Output voltage</td>
<td>400V-500Hz 3 phase</td>
</tr>
<tr>
<td>Output rating</td>
<td>5 kW (oversized)</td>
</tr>
<tr>
<td>Efficiency</td>
<td>94%</td>
</tr>
</tbody>
</table>

#### INVERTER

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Input voltage</td>
<td>400V-500Hz, 3 phase (max)</td>
</tr>
<tr>
<td>Output voltage</td>
<td>230V 50 Hz alternating current (AC) single phase</td>
</tr>
<tr>
<td>Output rating</td>
<td>4 kW</td>
</tr>
<tr>
<td>Voltage tolerance</td>
<td>± 5 %</td>
</tr>
<tr>
<td>Frequency tolerance</td>
<td>± 0.1%</td>
</tr>
</tbody>
</table>

#### MECHANICAL SPECIFICATIONS

<table>
<thead>
<tr>
<th>Specification</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Supply includes</td>
<td>Sound shield with steel base, mounted on double set of rubber anti vibration mountings. (Genverter without sound shield is optional)</td>
</tr>
<tr>
<td>Dimensions l x w x h</td>
<td>630x480x520 mm</td>
</tr>
<tr>
<td>Colour</td>
<td>Metallic silver / white</td>
</tr>
<tr>
<td>Weight</td>
<td>92 kg including sound shield</td>
</tr>
<tr>
<td>Standard supplies</td>
<td>Digital remote panel (10 m cable), fuel filter, fuel lift pump, user and installation manuals</td>
</tr>
<tr>
<td>Available as option:</td>
<td>Installation kits, non earth return (ungrounded), spare part kits longer or shorter DDC cables.</td>
</tr>
</tbody>
</table>
4.4 SPECIFICATION OF THE ACCESSORIES

<table>
<thead>
<tr>
<th>Accessory</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fuel filter/water separator</td>
<td>30 micron</td>
</tr>
<tr>
<td>Fuel inlet and return</td>
<td>8 mm</td>
</tr>
<tr>
<td>Flexible Exhaust bellow/hose</td>
<td>(1&quot;G)</td>
</tr>
<tr>
<td>Exhaust piping</td>
<td>(1&quot;)</td>
</tr>
<tr>
<td>Exhaust mufflers</td>
<td>(1&quot;G)</td>
</tr>
<tr>
<td>Starter battery</td>
<td>55 Ah</td>
</tr>
</tbody>
</table>

4.5 INSTALLATION MATERIALS W-GV4

**Figure 20: Installation materials battery installation kit**

**BATTERY INSTALLATION KIT 55 Ah**

<table>
<thead>
<tr>
<th>pos.</th>
<th>qty</th>
<th>article no</th>
<th>description</th>
</tr>
</thead>
<tbody>
<tr>
<td>51</td>
<td>1</td>
<td>64000550</td>
<td>Whisper Power 12/55 Ah AGM Battery</td>
</tr>
<tr>
<td>52</td>
<td>1</td>
<td></td>
<td>Battery charger</td>
</tr>
<tr>
<td>55</td>
<td>1</td>
<td>68230302</td>
<td>Terminal Cover RED 230N3V02</td>
</tr>
<tr>
<td>56</td>
<td>1</td>
<td>68230314</td>
<td>Terminal Cover BLACK 230N3V14</td>
</tr>
<tr>
<td>58</td>
<td>4</td>
<td>6503001608</td>
<td>Cable lug 16mm² / M8</td>
</tr>
</tbody>
</table>

**TOTAL**

BATTERY INSTALLATION KIT 55Ah
### 4.6 FUEL KIT

![Diagram of fuel kit installation]

#### FUEL KIT

<table>
<thead>
<tr>
<th>no</th>
<th>qty</th>
<th>article no</th>
<th>description</th>
<th>dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>41</td>
<td>2</td>
<td>50221203</td>
<td>Straight coupling</td>
<td>8 mm</td>
</tr>
<tr>
<td>42</td>
<td>1</td>
<td>40230090</td>
<td>Fuel strainer/water separator</td>
<td>M14x1.5 mm</td>
</tr>
<tr>
<td>43</td>
<td>2</td>
<td>50221618</td>
<td>Parallel male stud coupling</td>
<td>M14 - 8 mm</td>
</tr>
<tr>
<td>44</td>
<td>2</td>
<td>50221644</td>
<td>Reducing male nipple</td>
<td>M14-M16 60 gr.</td>
</tr>
<tr>
<td>45</td>
<td>2</td>
<td>50221615</td>
<td>Hose connection</td>
<td>8 mm</td>
</tr>
<tr>
<td>46</td>
<td>2</td>
<td>50221616</td>
<td>Nut coupling</td>
<td>M16x1.5 mm</td>
</tr>
<tr>
<td>47</td>
<td>1</td>
<td>50221252</td>
<td>Nipple hose pipe</td>
<td>8 mm</td>
</tr>
<tr>
<td>48</td>
<td>4</td>
<td>50221522</td>
<td>Hose clamps</td>
<td>10-16 mm</td>
</tr>
<tr>
<td>49</td>
<td>2</td>
<td>50221632</td>
<td>Gasket ring</td>
<td>14x20x1.5 mm</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>TOTAL</strong></td>
<td><strong>40230205</strong></td>
</tr>
</tbody>
</table>

#### OPTIONAL INSTALLATION MATERIALS

<table>
<thead>
<tr>
<th>no</th>
<th>qty</th>
<th>article no</th>
<th>description</th>
<th>dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>50</td>
<td>1</td>
<td>50222020</td>
<td>copper fuel pipe</td>
<td>6x8 mm</td>
</tr>
<tr>
<td>51</td>
<td>1</td>
<td>50220063</td>
<td>fuel hose</td>
<td>8x16 mm</td>
</tr>
</tbody>
</table>

- Spare parts fuel kit

<table>
<thead>
<tr>
<th>pos.</th>
<th>qty</th>
<th>article no</th>
<th>description</th>
</tr>
</thead>
<tbody>
<tr>
<td>46</td>
<td>1</td>
<td>40230092</td>
<td>Filter for strainer fuel/water separator</td>
</tr>
</tbody>
</table>

---
4.7 EXHAUST KIT

EXHAUST INSTALLATION KIT 1" GV4 MOB

<table>
<thead>
<tr>
<th>pos.</th>
<th>qty</th>
<th>article no</th>
<th>description</th>
</tr>
</thead>
<tbody>
<tr>
<td>30</td>
<td>1</td>
<td>50230609</td>
<td>Absorption muffler 1&quot;G</td>
</tr>
<tr>
<td>31</td>
<td>1</td>
<td>50230610</td>
<td>Resonance muffler 1&quot; G</td>
</tr>
<tr>
<td>32</td>
<td>1</td>
<td>50221471</td>
<td>Bent M/F 1&quot; G</td>
</tr>
<tr>
<td>33</td>
<td>2</td>
<td>50221411</td>
<td>Sock F/F 1&quot; G</td>
</tr>
<tr>
<td>34</td>
<td>1</td>
<td>50221421</td>
<td>Coupling F/F 1&quot; G</td>
</tr>
<tr>
<td>35</td>
<td>1</td>
<td>50220041</td>
<td>Stainless flexible exhaust pipe F/M 1&quot;G</td>
</tr>
<tr>
<td>36</td>
<td>3</td>
<td>50221664</td>
<td>Tail bracket 250 mm M10 42-60mm</td>
</tr>
<tr>
<td>37</td>
<td>3</td>
<td>50221661</td>
<td>U-bolt M10 42 mm</td>
</tr>
<tr>
<td>38</td>
<td>6</td>
<td>50211406</td>
<td>Washer M10</td>
</tr>
<tr>
<td>39</td>
<td>6</td>
<td>50211447</td>
<td>Spring washer</td>
</tr>
<tr>
<td>40</td>
<td>6</td>
<td>50211446</td>
<td>Nut M10</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>40201325</td>
<td>EXHAUST INSTALLATION KIT 1&quot;</td>
</tr>
</tbody>
</table>

Figure 22: Exhaust kit
5 DIAGRAMS & DRAWINGS

5.1 ELECTRICAL DIAGRAMS

Fig. 22: Electrical control diagram overview
The diagram on the left shows the connections for an optional diesel pre-heater.

Fig. 23: local control panel overview
5.2 LAY OUT CONNECTIONS

Fig. 24: Lay out connection terminals
The remote panel comes in a carton that can be used as a template to drill the mounting hole.