



USERS MANUAL FOR

Belt Power belt driven generator

W-BD 3.5 / W-BD 5: 230V 50Hz



Art.nr. 40200571

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V3 November 2011

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1 INTRODUCTION

1.1 GENERAL

The Belt Power belt driven generator makes it possible to generate 230V 50 HZ AC Power from the main engine of a vehicle or boat or any other engine running at variable speed or fixed speed, to drive a specially designed generator. A dedicated inverter inverts the variable voltage and frequency from the generator to a smooth sine wave output of 230V 50Hz.

The Belt Power is designed for applications on vehicles and boats and is manufactured for and marketed by Whisper Power.

It is important to read this manual before installing and operating the Belt Power. Refer to the installation manual. Both safety and durability rely very much on the correct identification, installation and a good understanding of ratings, features, design, maintenance and operation procedures.

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.

All of the specifications, provisions and instructions contained in this manual apply solely to standard versions of the Belt Power first launched in June 2010

This manual is valid for the following models:

| Part number | Description |
|-------------|----------------------------|
| 41301000 | W-BD 3.5 3.5 kW, 230V 50Hz |
| 41302000 | W-BD 5 5 kW, 230V 50Hz |

For other models and power generation products we have other manuals available on our website: www.whisperpower.eu.

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.



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.



DANGER

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

1.2 SERVICE AND MAINTENANCE

Regular service and maintenance should be carried out according to the directions in this manual. For service and maintenance one can appeal to the manufacturer or the dealers.

1.3 GUARANTEE

Whisper Power guarantees that this Belt Power generator has been built according to good workmanship, according to the specifications in this manual and according to European Community safety regulations.

During production and prior to delivery, all of our Belt Power generators are tested and inspected.

The well functioning of this Belt Power generator is subject to guarantee. The period and conditions of this guarantee are laid down in the general conditions of delivery as registered with the Chamber of Commerce and Industries for the North of the Netherlands number 01120025 and are available on request. The guarantee period is two years or 1000 running hours; whatever comes first. Some aspects of our guarantee scheme are given here in more detail:

Guarantee does not cover failures that are caused by misuse, neglect or a faulty installation.

Example 1. Faulty installation:

V-belt alignment problems are the most common cause of problems with Belt Power generators. Incorrect alignment of the V-belt pulleys will cause extreme wear out of the V-belt, pulleys and generator bearings.

To obtain the rated power from the generator requires accurate calculations on engine power, rpm and pulley diameter ratio's for optimal generator performance.

The inverter, generator and other parts should be protected against the influences of the weather and splashing water (with dirt and salt) below the vehicle. Refer to the installation manual for instructions but remember these are for guidance only as many factors influence the installation of a Belt Power. The ultimate responsibility will always be with the owner to ensure a safe and compliant installation. If in doubt ask!

Example 2: Misuse:

Long term running with high load on or too low rpm cause overheating problems and can damage the generator and V-belt transmission.

Example 3: Neglect

Running with a loose V-belt will cause wear out and damage from the slipping V-belt.

Guarantee means that faulty parts are repaired or replaced free of charge. Labour necessary to complete repairs on board a vehicle executed by an authorized service engineer is covered, but is limited to a reasonable number of hours and reasonable rates in relation to the actual repair work that has to be done. Also covered is the labour required to take an generator or inverter out of a vehicle or for reinstallation, also limited to a reasonable number of hours and reasonable rates.

Travel expenses and travel hours are not covered. There is no cover for labour needed to get access to the inverter or generator, for example to remove equipment or parts of the vehicle body etc.

Goods to be delivered under guarantee will be invoiced. Only after the faulty goods are returned will the invoice be credited. Payment in advance may be required or guaranteed by credit card. If after the faulty goods are returned, it is indicated that the failure was not covered by guarantee a credit will not be issued. For example if a Printed Circuit Board is returned with clear damage caused by water, guarantee will be refused.

Freight costs to deliver spares by normal mail or carriers is covered under guarantee. Special services like express mail, overnight delivery etc. are not covered. Taxes and duties are not covered. For shipments to remote areas any additional costs incurred over normal carriage will be invoiced to the customer.

The cost for returning faulty goods is not covered under guarantee.

If any problem arises which could be subject of guarantee, procedures should be followed as described in the

guarantee conditions, unauthorised repairs could lead to further damage and violate the guarantee conditions.



The cover of the inverter box should not be removed at any time. Service at the inverter should only be made by authorised service stations. Unauthorised repairs and work, which is not in accordance with the guidelines, instructions and specifications contained in this user's manual and in the supplementary installation manual can cause damage. In all these cases the guarantee may become invalid. Use original spare parts only!

1.4 LIABILITY

Whisper Power does not accept responsibility for damage, injuries or casualties which are the result of operation of the Belt Power in specific conditions which brings dangers which could not be foreseen, or could be avoided by additional measures. Whisper Power does not accept liability for damage due to use of the Belt Power, possible errors in the manuals and the results thereof.

1.5 IDENTIFICATION

1.5.1 General

Before using this Belt Power it is very important to identify the model correctly. To communicate for service or ordering parts it is also essential to correctly identify the Belt Power. Also for the daily operation of the Belt Power it is necessary that the operator knows the correct specifications.

1.5.2 Identification plate

All required identification data are on the identification plate of the inverter box. On the generator is an type model referring to the generator only. For location of the identification plates see figure 1.

| | | | |
|----------------------|--------------------|---------------------|--------|
| | | | |
| PRODUCT No. | MODEL | SERIAL | |
| 41302002 | INVERTER BOX W-BD5 | A6150001 | |
| Date | 2010 | Input Vdc | 12 |
| Output Voltage | V230 | Inverter Box Weight | Kg 9,5 |
| Output Frequency | Hz 50 | Hardware Rev. | 1.0 |
| Output Current Max. | A 85 | Firmware Rev. | 1.0 |
| Output Current Cont. | A 24 | | |

Fig. 1: Location identification plate inverter box.



Fig. 2: Identification plate inverter box.

- The identity of the Belt Power inverter box is given by the SERIAL NUMBER on the type plate of the inverter box. This number is also on the first page of this users manual. The identity of the generator is given by the SERIAL NUMBER on the type plate of the generator. The identification plate of the generator is on the generator and gives the Article Number and serial number and power rating (3.5 or 5 kW)
When this numbers are available the manufacturer can trace the specifications of the inverter and generator. On the identification plate are also some basic features of the inverter and generator:

- POWER**
The identification plate gives the nominal maximum continuous load in kVA (= kW) calculated with power

2 INFORMATION

2.1 SAFETY

2.1.1 General

When correctly installed and used in normal circumstances this Belt Power fulfils EC safety regulations. This Belt Power could be part of an installation or could be used in a way that additional regulations of the EC or other authorities have to be taken into account. Regarding the

factor one. When calculating a load one should always take into account the power factor or cos. phi of this load. The power should never exceed the nominal power as shown on the identification plate. Power is rated at an ambient temperature of 25°C. For higher temperatures the Belt Power has to be derated.

- VOLTAGE** shows the nominal voltage. This voltage should be within the specified tolerance at the nominal generator rotation speed..
- FREQUENCY** is shown in Hz and is not determined by the speed of the engine as this is a variable speed generator and the frequency is generated by the inverter.
- CURRENT (Amps)** shows the maximum current that is acceptable at the specified frequency, voltage and power factor.
- WEIGHT** shows the weight (approximately) in kg. This is without, packing and external installation equipment.
- CE-marking:** the "CE" symbol shows that the Belt Power is build according to European Community safety regulations. This includes the Pleasure Craft Directive, regulations regarding electric safety and electric magnetic compatibility (EMC) and other relevant directives. Regarding the Machinery Directive the Belt Power is an incomplete machine and can only comply after installation. Refer to the Declaration included in this manual.

Safety also relies on the installation, application and circumstances. See also the remarks in this manual under SAFETY

Before changing a factory setting you are advised to consult the manufacturer. When the Belt Power you have to identify is not new you have to take into account the possibility that former users may have changed the settings. Check the settings (voltage, frequency, max. load) when there is any doubt.

Machinery Directive the Belt Power is an incomplete machine and can only comply after installation. Refer to the Declaration included in this manual.



Circumstances could make it also necessary to take additional measures. Be aware of wet

conditions and hazardous environments caused by explosive gases etc



ATTENTION! An important safety feature is when the inverter is automatically switched off because of a low speed alarm and later the speed is increased again the inverter must be switched on again manually, because it could be dangerous when appliance start spontaneously such as a saw or a drill.



However this could be very inconvenient for other applications that are permanently switched on. On request Whisper Power can adjust the software to change this feature so that the power comes back automatically when the speed is in order again.

2.1.2 Electrical safety



The generator output (which is the inverter input) can be as high as 340 Volt and is very dangerous. The only way to get access to the high voltage parts is with the help of tools. One should never run the Belt Power when there is access to these parts. Contact to this parts may result in electrical shock which will result in severe personal injury or loss of life.



Also the 230 Volt generated by the inverter is dangerous and if instructions and procedures are not strictly observed may result in electrical shock which will result in severe personal injury or loss of life.



Never connect the inverter output to a 230V connection to the public grid.

When a connection to the public grid is required, a "shore" or "land" power source selector switch must be installed between the inverter and the boat's/vehicle's electrical system.



Realise that people are not used to have 230V available on a vehicle or small boat. 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 or boat.

- Check all wiring at least on a monthly base. Defects, such as loose connections, burned cables etc. must be repaired immediately.

- Do not work on the electrical system if it is still connected to a current source. Only allow changes in your electrical system to be carried out by qualified electricians.
- The inverter box cannot be opened without special tools. The cover must not be removed at any time. Service on the electronics must only be made by authorized personnel.
- Connection and protection must be done in accordance with local standards.
- Extension cables must be suitable for outdoor use:
3.5 kW model: Use 16 Amp rated cable (2.5mm²) maximum 100 m.
5 kW model: Use 25 Amp rated cable (4mm²) maximum 100 m.
- The DC control voltage should be fused with:
Fuse: W-BD 3,5 3 Amp. And W-BD 5 12/15 Amp.



Warning signs indicate parts which could be live.

2.1.3 Earth insulation failures

According to local regulations and depending on the application it could be necessary to take measures for protection against earth insulation failures.

In the standard delivery "neutral" and "ground" are not connected. To make a connection between "neutral" and "ground" could be necessary as part of a specific insulation failure protection system.



In all situations the transfer switches between shore and Belt Power should switch both neutral and L1..

2.1.4 Installation

Generator and inverter are not self contained and have to be properly installed in enclosed areas. Installation includes measures for proper ventilation, safe electric connections. Refer to the installation manual.



Do not use the Belt Power when the vehicle is inside a building or in other enclosed area's. Be aware using the Belt Power in wind still conditions, when the exhaust fumes could accumulate under, around or even in the vehicle.

2.1.5 Operation

When the on/off switch is in the on-position when the vehicle (boat) engine starts the inverter will immediately generate 230V to the outlet. Ensure that all appliances not intended to use are switched off or disconnected

Close to the generator will be moving parts like fans and V-belts and hot engine parts.



Take note of the signs on the Belt Power parts which show symbols in a triangle indicating danger.

- The Belt Power should be operated by authorised personnel only.
- Be aware of hot parts engine parts and especially parts of the exhaust system and the cooling system.
- If the Belt Power is unsafe, fit danger notices and disconnect the battery positive (+) lead of the engine so that it cannot be started until the condition is corrected.
- Do not attempt to operate the Belt Power with a known unsafe condition.
- Always consult the manual before carrying out maintenance.
- Do not change the settings without consulting the manufacturer. Keep a record of setting changes in this manual.

2.1.6 Fire and explosion



Engine fuels can be flammable. Proper handling limits the risk of fire and explosion.

- Avoid refilling the fuel tank while the engine is running. When oil or fuel is leaking do not use the Belt Power.
- Do not run the engine close to explosives or gasses.
- Hydrogen gas generated by charging batteries is explosive. Ensure for proper ventilation. Do not smoke or allow sparks, flames, or other sources of ignition around batteries.
- Keep a fire extinguisher on hand.

2.1.7 Chemicals

- Fuels, oils, coolants, and battery electrolyte can be hazardous to personnel if not treated properly. Do not swallow or have skin contact with these liquids. Do not wear clothing that has been contaminated by fuel or lubricating oil.

2.2 STORAGE

- After transporting the Belt Power check for damage before installation.
- Long term storage can have detrimental effects on the generator and inverter.
- The generator windings and some electronic components in the inverter tend to condense. To minimise condensation, store the generator and inverter in a dry and warm storage area.

2.3 FEATURES BELTPOWER

2.3.1 How does it work?

A special designed generator (generator) has to be mounted on an available engine such as the main automotive engine or propulsion engine in a boat. The generator is driven by V-belt/pulley transmission.

The generator generates a high voltage between 200 Volt and 340 Volt (on a very high frequency) that is converted by a special designed inverter to a 230 Volt 50 Hz sine wave output, independently of the rpm of the engine, with a very high efficiency of about 94%.

There are two benefits that makes this system superior to systems that work on low DC voltage (12V or 24V). First high voltage means low currents and little resistant losses and thinner cables. Secondly the inverter does not need to transform a low battery voltage up to 230 Volt which saves a transformer or step up module. All together the efficiency is much higher and the installation much easier. Because of the small dimensions the Belt Power will fit where a diesel driven generator is too big and heavy. The most common applications are service vans, ambulances, fire fighting vehicles and small pleasure crafts.

The inverter will often be placed in a separate compartment where it is more protected against dirt and humidity.

The generator speed depends on the ratio of the pulleys and the engine speed. The pulley/belt transmission system should be calculated and designed to keep the generator in the RPM area where it can perform optimally. Refer to the installation manual for more details. When necessary one can extend the installation with an manual- or automatic system to adapt the speed to the load applied. Refer to the installation manual for more details.

All cables and hoses are guided through the inverter housing and connected on a terminal board inside.

Installation accessories are listed in the installation manual and are available through the supplier of the Belt Power.

The Digital Control system of the Belt Power is based on microprocessor technology. The system can be controlled and monitored from the display on the inverter casing and

via a remote control panel. The remote control panel includes 5 meter remote cable. 10 or 15 m cable can be ordered as option with the Belt Power.

2.3.2 Application

The Belt Power generator is a very good solution for vehicles and small boats that require AC power and does not have enough space for a diesel generator. As the inverter works independently from a battery, the installation is not as heavy as a battery based inverter system and is more efficient, because a fully battery based inverter system would have a battery efficiency loss of at least 20% and other losses for transforming the low DC to high AC. Especially when high power is needed from 2 kW up to 5kW the Belt Power is superior.

For some applications where power is needed while the vehicle engine cannot run or when the engine runs at a too low speed (RPM) a combination with a battery based inverter/charger (COMBI) system is recommended.

While the engine is not running the battery based inverter can take care of supply and when running again the belt driven generator can charge the batteries via the charger. One has to take care that both inverters can work in

parallel! Many of the latest generation combi's can run in parallel! The Power Belt inverter and combi could also work together to provide extra power for short periods or handle inrush currents for motor starting (starting up air conditioners or compressors). The combination of both systems does require a smaller battery than when applying only a low DC inverter.

2.3.3 Documentation

Included in the delivery are:

- This users manual (number: 40200571)
- An installation manual (number: 40200591)

Manuals in many languages are available on our web site: www.whisperpower.eu.

In this manual there is a list of important parts for maintenance and spare parts as well as a chapter on maintenance and problem solving.

2.4 COMPONENTS

2.4.1 Main components to identify



Fig. 3: Main components of the Belt Power

2.5 TECHNICAL INFORMATION

The Belt Power is a very advanced high tech variable speed electric power supply system. It is based on the latest inverter and generator technology and offers a very stable sinus and high efficiency.

2.5.1 Generator

The Three Phase 230V Generator (200Volt up to 340V) is made according to a dedicated design and offers usable power over a large frequency band. Further technical data on the design of the generator can be found in drawings and diagrams in this manual.

2.5.2 Inverter

To invert the variable voltage output from the generator to 230V 50Hz AC a state of the art inverter is applied. The inverter should be mounted in an separate protected space. Technical data are below (2.5.7).

2.5.3 Alarms and shut down

The inverter can shut down because of overheating, overload, short circuit or low RPM.

When the RPM decrease and the load is higher than the alternator can deliver the inverter shuts down. Then the inverter will restart three times with 5 seconds delay. The user or system should disconnect some load, so the alternator and inverter is capable to deliver the power.

In case the inverter is in failure, the failure is shown on the display and the alarm led on the inverter burns.

2.5.4 Control

The Belt Power can be operated by switch on the panel on the inverter box or on the remote control. By switching the switch to ON the control system is activated and will generate electricity when the engine is running. Switching OFF will switch off the inverter and there will be no AC output any more. **In case of a remote panel the switch on the inverter box operates as a main switch that has to be ON before the inverter can be switched on via the remote panel.**

The same switch can be used to switch off the Belt Power.

After a failure has switched off the inverter. It must be manually reset by switching the OFF and ON again (either on the inverter or on the remote) to be able to use the Belt Power again. This could be inconvenient when the failure is because of a too low speed situation. Specially when the system is used in a driving vehicle the engine rpm is depending on the speed of the vehicle.



ATTENTION! People have to be aware the output voltage will return after shutdown.

In some applications this is not allowed and therefore this function must be switched off by Whisper Power.

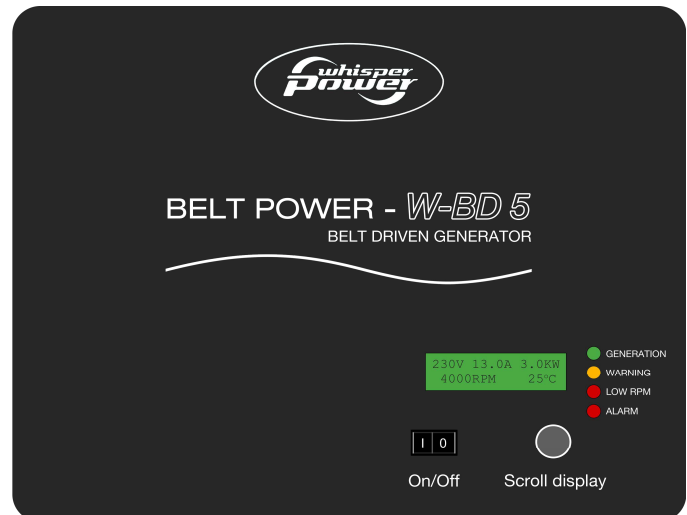


Fig. 4: Belt Power control panel

2.5.5 Remote control panel

A remote control is available that offers the same control and monitoring functions as are available on the inverter box. All wiring connections from the remote control to the Belt Power control unit are made by plug in connectors.

An intermediate communication cable is in the standard supply. If necessary an optional longer 8 wire communication cable can be connected if the standard length does not suit the required distance (Refer to installation manual)

2.5.6 Display

Both on the inverter box as well as on the remote control panel is a display that shows the status of the system as well as many relevant parameters and failure indications. By pushing the button below the display one can scroll to different display modes. An overview of these modes is on page 17 of this manual. The additional LED signals are only on the inverter box and not on the remote panel.



Fig. 5: Belt Power remote control panel

2.5.7 Technical data

GENERAL

| | |
|-------------------------|--|
| Model | W-BD 3.5/ W-BD 5 |
| RPM/Power | W-BD 3.5: 2500 rpm/1 kW, 4000 rpm up to 15000 rpm/ 3.5 kW. (Refer to diagram) W-BD 5: 3300 rpm/1 kW, 7000 rpm up to 15000 rpm/ 5 kW. (Refer to diagram) |
| Continuous Power | 3.5 kW /5 kW 230V 50Hz pure sine wave |
| Peak Power | 7.5 kW/10 kW |
| Alarms | Short circuit – overload – over-temperature - low/high rpm - low/high voltage |
| Fuse DC control voltage | Fuse: W-BD 3,5 10 Amp. W-BD 5 12/15 Amp. |
| Battery Supply | W-BD 3.5 12 V up to 24V self ranging; W-BD 5 only 12 V* |

*When needed a small 24V to 12 V DC/DC converter can be supplied as an option

GENERATOR

| | |
|---------------------------------------|---|
| Model | AAN 3.5 kW/ AAN 5kW* |
| Power rating | 3.5 kW/ 5 kW* |
| Max rotor voltage | 14.4 V |
| Rotor resistance | 2.85 Ω \pm 0.1 Ω |
| Output (stator) voltage | 200V-340V, 3 phase |
| Stator resistance (between phases) | 3.5kW: 5.3 Ω \pm 0.25 Ω / 5kW: 2.9 Ω \pm 0.25 Ω * |
| Dimensions generator | 159x178x190 mm |
| Weight | 6.9 kg |
| Standard pulley | Poly V 6 groove \varnothing 60 mm; other pulleys on request, refer to the installation manual |

* In some installations we recommend to apply a 5 kW generator in combination with a 3.5 kW inverter. Check the generator type plate for identification.

INVERTER

| | |
|-----------------------------------|---|
| Input Voltage | 200V-340Hz, 3 phase |
| Output voltage | 230 V \pm 7% single phase |
| Output rating | 3.5 kW /5 kW at power factor cos. phi = 1 |
| Max nominal continuous current | 3.5 kW: 16 Ampere/ 5kW: 27 Ampere |
| Max surge current 320 ms | 3.5 kW: 32 Ampere/ 5 kW: 85 Ampere |
| Harmonic distortion | <7% |
| Frequency tolerance | \pm 0.5% |
| Efficiency | 95% |
| Dimensions inverter box w x d x h | 314x125x380mm |
| Weight inverter box | 9.6 kg |
| Colour | Metallic silver RAL9006 |

STANDARD SUPPLIES

| | |
|-----------------|--------------------------|
| Supply includes | Generator, Inverter box, |
|-----------------|--------------------------|

OBLIGATORY EXTRA SUPPLY Shielded cable (To be choose from 3 lengths: 5, 8 or 10 m)
Including kit with installation material

OPTIONAL SUPPLIES

| | |
|-----------------------|---|
| Optional supplies | Remote control panel including cable |
| Installation supplies | Generator pulley, drive pulley, mounting brackets, V-belts. |

2.5.8 Lay out control wiring

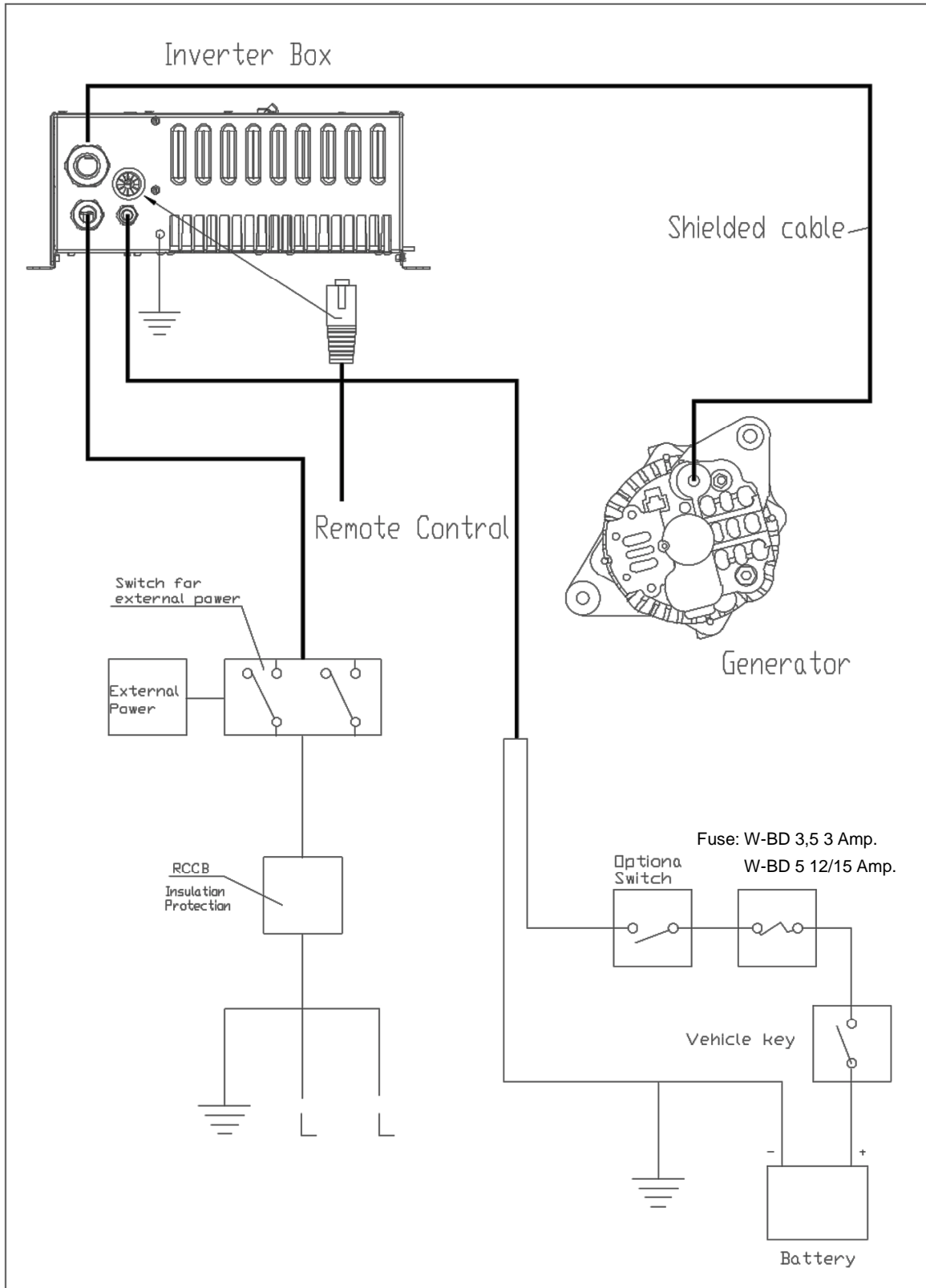


Fig. 6: Electrical Diagram

3 OPERATION

3.1 GENERAL

The Belt Power is operational after full installation and connecting the remote control panel.

3.2 CHECKING BEFORE USE



Do not start the engine before thoroughly checking the installation.

Mechanical inspection

- Check the generator and make sure that it is securely and irremovable mounted on the engine.
- Check the pulleys and make sure that they are parallel and aligned.
- Make sure that the belt and the pulleys can run without obstruction.
- Make sure that the belt is tightened according to the manufacture's instructions.
- Make sure that the belt has sufficient clearance in order not to damage surrounding parts at large load changes.
- Check that the Power Box is mounted correctly:
 - on a plane surface;
 - in a well-ventilated area;
 - protected against moisture.
- Check that the openings of the Inverter Box are not covered.

Electrical inspection

- Make sure that all the wiring is done in a secure and correct way.
- Make sure that all cables are undamaged, unloaded, securely attached, not rubbed or pinched in any way.
- Check that all cables are mounted and tightened in a proper way.
- Check that all connectors and socket screws are well tightened.
- Check that all appliances not intended for use are turned off or disconnected.
- Make sure that the earth connection is correctly installed.

Precautions before starting

Before switching on the Belt Power check:

- that appliances not intended for use are turned off or disconnected;
- that the engine is correctly running (**if not:** the green LED is flashing after switching on the inverter.).

- that the requested/needed electrical power is adequate for the nominal output (**if not:** the Power Box starts with auto-protection, the red LED is continuously lit).
- that the generator's revolutions are adequate for the requested electrical power.
(**if not:** the Power Box starts with auto-protection, the red LED is continuously lit. See page 9 and 10 in the installation manual.

Starting Belt Power

- Switch on the control panel **and** via the remote control if it is present. In case of a remote panel the switch on the inverter box operates as a main switch that has to be "ON" before the inverter can be switched on via the remote panel..
- Check the LEDs of the Power Box (see chapter "Display elements" on page 1).
- When the green LED is continuously lit switch on the electrical load according to the nominal load and the correspondent generator's speed.
- By the push button on the inverter or on the remote one can scroll between different display modes that show information on several parameters.

Shutting down

- Turn off all electrical appliances which shall not start automatically when the Belt Power is switched on again.
- Switch OFF Belt Power on the control panel or via the remote control.

4 MAINTENANCE

4.1 GENERATOR

Keep the generator clean and in dry condition. Check if cooling air has free access. Check the V-belt for alignment and for wear out (refer to figure 7). Replace when the V-belt shows signs of wear out. The lifetime of the brushes and bearings is strongly depending on the installation, environmental conditions and application. In good conditions and mild application the average life time of the bearings is at least 6000 hours for the front bearing and 20.000 hrs for the rear bearing.

Every 1000 hours the bearings must be checked. The average life time of the brushes is 7500 hrs. Every 1000 hrs the brushes must be checked.



A belt too tight or too loose will reduce the life of the belt and generator (pulley and bearings) and will reduce the performance.

4.2 INVERTER BOX

The electronic equipment itself in the inverter box does not require any maintenance. Keep the air inlet opening free from dirt and blockages. The air filters inside the box are designed for five time use. In case of extreme polluting conditions the filters must be changed by an authorized service station. The inverter box cannot be opened without special tools. The cover must not be removed at any time. Service on the electronics must only be made by authorized personnel.

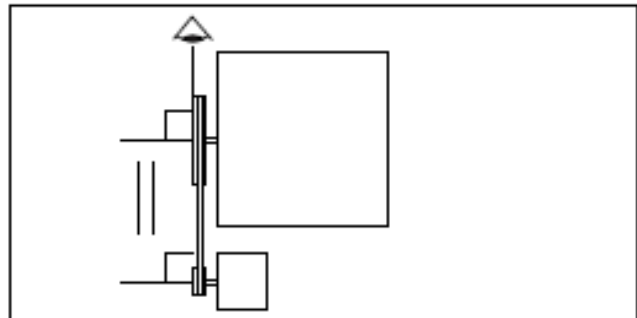


Fig. 7: Alignment V-belt

5 TROUBLE SHOOTING

5.1 GENERATOR/ELECTRICAL FAULTS



Beware of parts which are live! The generator generates a high voltage up to 340 Volt

5.1.1 General

If any problem should occur, check basic conditions and examine all external wiring, switch gear and circuit breakers. Check if the V-belt slips. Check the V-belt alignment (refer to figure 6). Also check if measuring instruments give the correct value. If in doubt, measure directly on the inverter and generator terminals with an independent instrument. A failure code is displayed when a failure in the system is detected. Refer to the following pages.

5.1.2 Service address

If you cannot correct a problem with the aid of the malfunction table, contact your Whisper Power Service Centre or WhisperPower Netherlands for an extended service list, service@whisperpower.nl.

TEL INT + 31-512-571550.

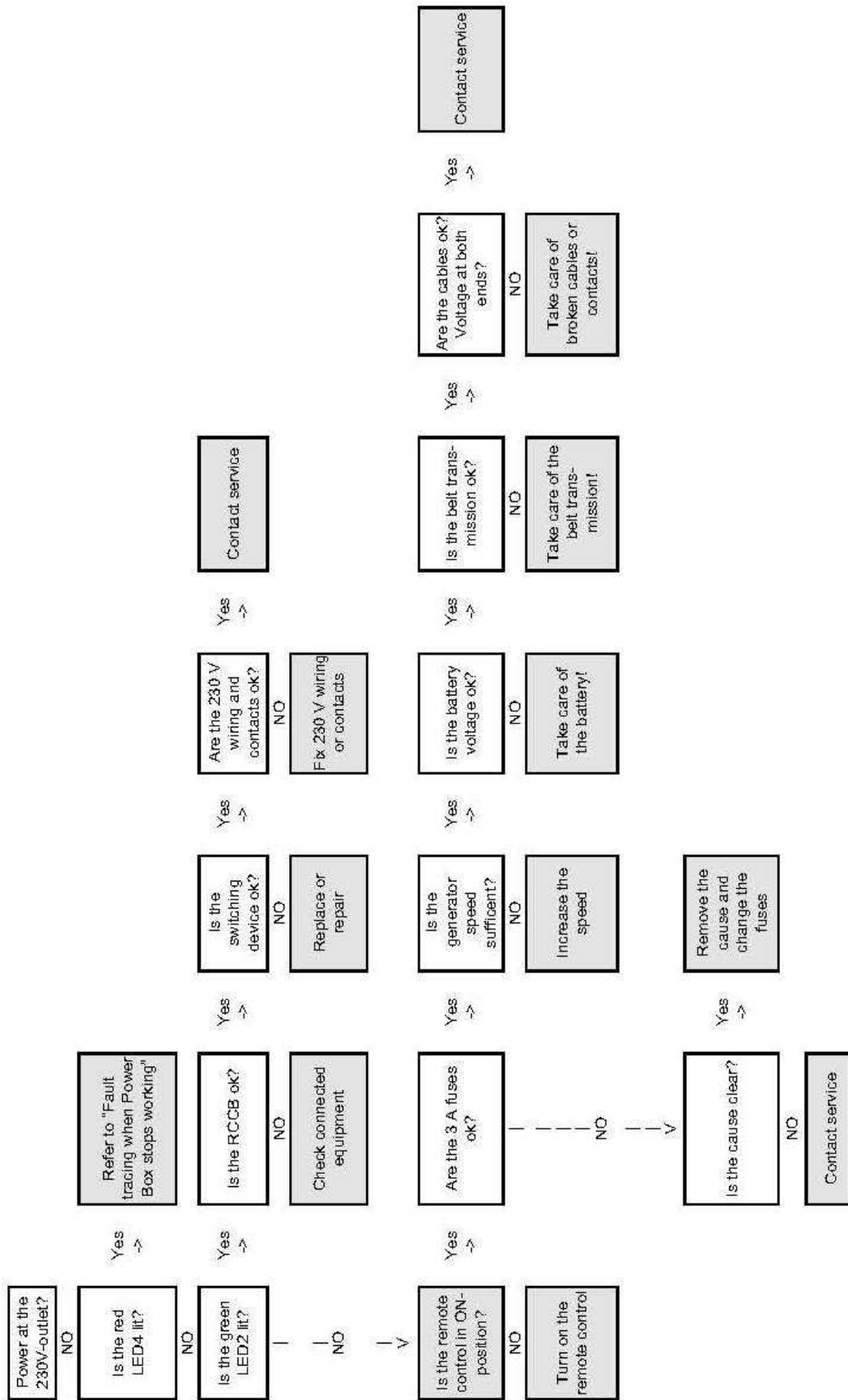
5.1.3 Display indication overview

| Display | Brief description | Description activation and end of activation | Interruption excitation | | | Critical Alarm | LED GENERATION GREEN | LED WARNING YELLOW | LED LOW RPM ORANGE | LED ALARM RED |
|------------------|--|--|--|------------------------|-----|----------------|----------------------|--------------------|--------------------|---------------|
| | | | Interruption output | | | | | | | |
| OPERATION FAULT | | | TAKE AWAY THE CAUSE OF THE FAULT AND RESET | | | | | | | |
| AC Under Voltage | Output voltage too low | Voltage lower than limit (180 V) for a certain time (1.8 sec) | Yes | Yes | Yes | | | | | C |
| No RPM | Engine stopped | RPM lower than limit (1.200 min ⁻¹) | No | – | No | F | | | | |
| Over-speed | Alarm engine RPM out of limit | RPM higher than limit | Yes | Yes after short delay. | Yes | | | | | C |
| Low RPM | Engine RPM too low for required energy | RPM lower than limit | No | No | No | C | | | C | |
| Short circuit | Output short circuit | Numbers of impulses from PWM with CC detected | Yes | Yes | Yes | | | | | C |
| Over-load | Alarm overload | Maximum (3.5kW : 17A) (5kW : 23A) | Yes | Yes | Yes | | | | | C |
| High-load | High load related to RPM | RPM has to be increased | No | No | No | C | | | C | |
| Over temperature | Alarm high temperature | Limit (65 °C) exceeded Fan will switch off when the temperature descends under the limit of 60°C. Must be reset manually | Yes | Fan on | Yes | | | | | F |
| SERVICE FAULTS | | | PLEASE REPORT FAULTS TO SERVICE DEPARTMENT | | | | | | | |
| AC Over Voltage | Output voltage too high | Voltage higher than limit (260 V) for a certain time (1.8 sec) | Yes | Yes | Yes | | | | | C |
| Mag fault | Short circuit in excitation | Alarm caused by hardware fault /wiring | Yes | Yes | Yes | | | | | C |
| V driver low | Alarm excitation voltage too low or M121 fault | Voltage of inner circuit less than limit: 14,4V | Yes | Yes | Yes | | | | | C |
| Param Error | Parameters module M121 fault | Control parameters | Yes | Yes | Yes | | | | | C |
| DC Over Voltage | Voltage DC Bus too high | Alarm produced by Hardware | Yes | Yes | Yes | | | | | C |

C Continuously lit

F Slowly flashing

5.1.4 Fault finding table when the system is not working



5.1.5 Fault finding table when the system stops working

| | | | | | |
|----------------------|----------|---|--|-----------|--|
| Is the red LED4 lit? | Yes → | Have several connections and disconnections of large loads within a short interval occurred? NO V | Restart and avoid such behavior | NO V | Restart Travel Power with the remote control |
| | | Has a large motor or compressor load been connected? | Reduce the load and avoid starting large motors/compressors at the same time | NO V | Restart Travel Power with the remote control |
| | | Is there a slackness in the 230 V installation or in the generator wiring? | Check the wiring | NO V | Restart Travel Power with the remote control |
| | | Does the battery have over or under voltage? | Take care of the battery according to the manufacturer's recommendations | NO V | Restart Travel Power with the remote control |
| | | Has the temperature protection been triggered? | Check that the power box installation is ok. Make sure the ventilation openings are unobstructed. Make sure the ambient temperature is normal. | | |
| | | Contact service | | | |

YES →
LED 4:
Slowly flashing

5.2 SPECIAL PROCEDURES GENERATOR

5.2.1 Checking the windings

When the basic conditions are in good order and a generator failure is suspected one should measure the output voltage on the generator and on the cable output to the inverter.

When the voltage between the phases of the output terminals of the generator is wrong (should be between 200 and 360 Volt) one could also measure the resistance of the windings for a confirmation of a winding failure.

The resistance between socket connections 1 – 2, 2 – 3 and 3 – 1 should be $783 \text{ m}\Omega \pm 20 \text{ m}\Omega$.

The resistance between socket connection 4 – 5 should be: 3.5 kW: $2.85 \text{ }\Omega \pm 0.1 \text{ }\Omega$ 5 kW: $2.85 \text{ }\Omega \pm 0.1 \text{ }\Omega$.

Measure the resistance between the generator housing and each of the cables 1 to 5. The resistance should be more than $1 \text{ M}\Omega$ for a sufficient insulation between winding and ground.



Fig. 8: Alternator connections

6 SPARE PARTS LIST

| ARTICLE NO | DESCRIPTION |
|------------|---------------------------------------|
| 41301000 | Belt Power 3.5 kW |
| 41302000 | Belt Power 5 kW |
| 41301001 | Generator 3.5 kW |
| 41302001 | Generator 5 kW |
| 41301002 | Inverter box 3,5 kW |
| 41302002 | Inverter box 5 kW |
| 41301010 | Brushes replacement kit |
| 41301011 | Bearing kit. |
| 41301020 | Shielded cable 5m |
| 41301021 | Shielded cable 8 m |
| 41301022 | Shielded cable 10 m |
| 41301025 | Cable remote control unit 5 m |
| 41301026 | Cable remote control unit 10 m |
| 50209133 | Cable remote control unit 15 m |
| 41301030 | Remote control unit |
| 41301031 | Sticker remote control unit |
| 41301040 | Set washers for alignment |
| 41301050 | Standard pulley Poly 6 V ϕ 60 mm |
| 41301051 | Pulley Poly 6 V ϕ 50 mm |
| 41301052 | Pulley Double V 12.7 mm ϕ 70 mm |
| | Other pulleys on request |

Refer also to our WEBSITE: WHISPERPOWER.EU.



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