



OPERATOR MANUAL

DIESEL GENERATOR

AGT 10001 DSEA
AGT 12003 DSEA



We are thank you on this way for purchasing our product!

WARNING! Before using the generator set, read this manual carefully to use your equipment correctly and to familiarize yourself with the safety and operating rules.

The manual defines the purpose for which the equipment was built and contains all the necessary information that guarantees your safe and correct use.

The manual is an indegral part of the generator set and must be carefully stored and attached to the quipment when it is passed on to another user.

This user manual must be used in conjuction with the engine user manual and controller user manual.

NOTE: Due to our constant concern for the improvement of our products as well as the ongoing research and development program, certain operating procedures, features and spare parts are subject to change without notice.

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1. SAFETY INSTRUCTIONS

Before operating the generator set or stating any maintenance operation, the operator must read and understand all warnings regarding the hazards in this manual and in the technical documentation of the engine and controller.

However, the manufacturer cannot anticipate all the possible situations that may involve possible risks in the real conditions of use and operation of the generator set.

Various operations and/or maintenance procedures not explicitly recommended in the user manual must be approved by the manufacturer.

If it is necessary to use a procedure that is not specifically recommended, the user must ensure that this is a safe operation, which cannot cause material damage or personal injury. The manufacturer assumes no responsibility for material damage or personal injury resulting from non-compliance with safety regulations.

Read the following safety rules carefully:

1. Do not allow the use of generator set by persons without the necessary qualification.
2. Keep children and animals away from the generator set.
3. Do not check the equipment while it is in operation. Always stop the engine before ant check, being careful not to touch the hot patrs.
4. Never connect the generator set directly to the public distribution network.
5. Do not use the generator in rain or snow. Do not intervene with wet or damp hands. Failure to follow these recommendations may result in electric shock to the user. Do not clean the generator set with water.
6. The generator set shall operate only on a flat and stable surface, not on gravel, sand, crushed stone or other unstable or sloping surfaces.
7. Make sure that the electrical connection from the generator to the load is not crushed by heavy parts or in contact with vibrating parts; it may break and cause a flame or short circuit.
8. Make sure that the engine is stopped before each refueling and/or refiling with oil/water.
9. Do not operate the generator set with the fuel tank, oil or radiator cap open. After each refueling, make sure that the fuel and/or oil tank plugs are closed properly to avoid leaks.

10. Place the generator set at least 1 meter from buildings or other structures, do not use the generator in garage rooms or any other insufficiently ventilated englosed spaces. Always keep the exhaust pipe free of foreign bodies or other obstacles to avoid gas poisoning.

11. Do not approach the rotating parts of the equipment with loose clothing or long unprotected hair, so as not to injure yourself.

12. The generator set must operate remotely from flammable and explosive material or products (petrol, oil, polystyrene, paper, sawdust, etc.).

13. In the event of excessive noise, oder or prolonged vibration, switch off the generator immediately and contact the nearest service center.

14. Do not obstruct the cooling and exhaust grilles.

2. WARNING LABELS



Read the manual before use!



Warning! Danger of electric shock.



Warning! Hot surfaces.



Warning! Danger of fire. Do not smoke or use open flames near the generator.



Switch off the generator while refueling and check for leaks.



Do not use the generator indoors!



Do not use the generator in the rain and in high humidity conditions!



Do not use the generator exposed to sunlight!



Read the fuel and oil safety instructions!

Hot surfaces! Keep your distance!

Diesel fuel is flammable and explosive.

The engine emits carbon monoxide which is a toxic gas. Do not use the generator indoors.

Ground indicator.

Guaranteed sound power level according to 2000/14/EC Directive.

Wear ear protection!

3. TABEL WITH DANGEROUS AREAS

Danger info	Area	Protective measures
Danger of burns	<ul style="list-style-type: none"> - Engine body. - Exhaust, the gallery and its terminals. - External housing near the exhaust pipe. 	<ul style="list-style-type: none"> - Allow the engine to cool down before performing any maintenance on it. - Allow the generator to cool before opening the side panels. - Do not park near the generator during operation. - Maintenance operations will only be carried out by qualified and authorized personnel.

Danger of crushing	- Moving the equipment	<ul style="list-style-type: none"> - Use means of transport appropriate to the type and weight specified. - Do not park/pass near or under the equipment while moving it. - Keep the equipment suspended only for the time strictly necessary to move it.
Danger of intoxication	- Exhaust pipe	<ul style="list-style-type: none"> - Keep your distance from the exhaust area during operation of the equipment or wear a protective mask.
Danger of corrosion and/or explosion	- Battery holder	<ul style="list-style-type: none"> - When replacing the battery, wear gloves, goggles and all appropriate protective equipment. - When recharging the battery, in addition to using gloves, goggles and appropriate protective equipment, remove the battery from the equipment case and place it in a well-ventilated area. - Strictly follow the battery manufacturer's recommendations.
Cutting or injuring	<ul style="list-style-type: none"> - Engine fan - Alternator fan 	<ul style="list-style-type: none"> - Make sure that the generator is switched off properly and the connection connector to a possible automatic panel is disconnected before opening any panel of the equipment. - Make sure that the terminal at the positive pole of the battery is disconnected before carrying out any inspection and/or maintenance on the equipment. - Make sure all panels are installed before turning on the equipment.

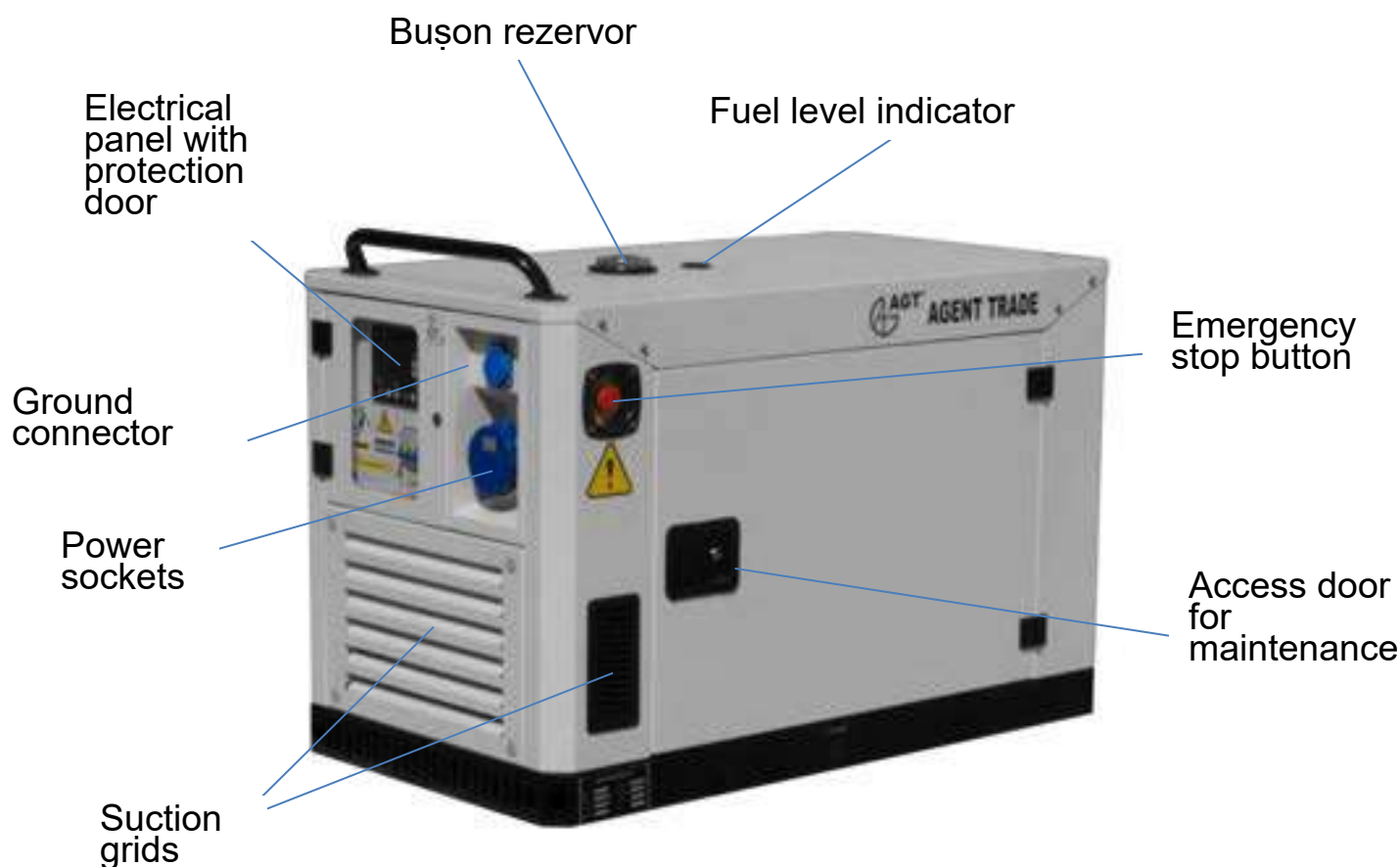
Danger of electric shock	<ul style="list-style-type: none"> - The electrical panel - Alternator contact box 	<ul style="list-style-type: none"> - Make sure that the generator is switched off properly and the connection connector to a possible automatic panel is disconnected before opening any panel of the equipment. - Make sure that all loads are disconnected and that the main switch in in the OFF position before carrying out any inspection and/or maintenance on the electrical equipment. - Make sure all panels are installed before starting the equipment. - Maintenance operations will performed only by qualified and authorized personnel.
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4. Technical specification

	AGT 10001 DSEA	AGT 12003 DSEA
Voltage	230 V / 50 Hz	400V / 50 Hz
Power factor	1	0.8
Max. power	9,6 kVA	12 kVA
Continuous power	8,5 kVA	10,6
Speed	3.000 rpm	
Engine	diesel, 2 cylinders, liquid cooling	
Governor	electronic	
Engine power	16 HP at 3.000 rpm	
Displacement	794 cm ³	
Fuel	diesel fuel	
Alternator	synchronous, AVR type with brushes	
Fuel tank capacity	25 liters	
Working autonomy	8,5 h at a charge of 8,5 kVA	8,5 h at a charge of 10 kVA
Starting	electric	
Protection	IP 23	
Controller type	HGM420	
Speed regulator	electronic	

Voltage stabilizer	electronic (AVR)
Oil bath capacity	2.3 liters
Oil type	API CD or CF
Cooling liquid	antifreeze solution (2.6 liters)
Glow spark plugs	Yes
Overload protection	Yes
Short circuit protection	Yes
Lack of oil pressure protection	Yes
Temperature protection	Yes
High/low speed protection	Yes
Protecție tensiune mare/mică	Da
Overall dimensions	1230mm × 675mm × 770mm
Weight	280 kg

5. Components



Exhaust
muffler

Access door for
maintenance

Cooling
air
exhaust
grille

Hooks for
lifting with a
crane



Antifreeze
fill cap

Exhaust
gallery

Fuel tank

Fuel valve

Fuel filter

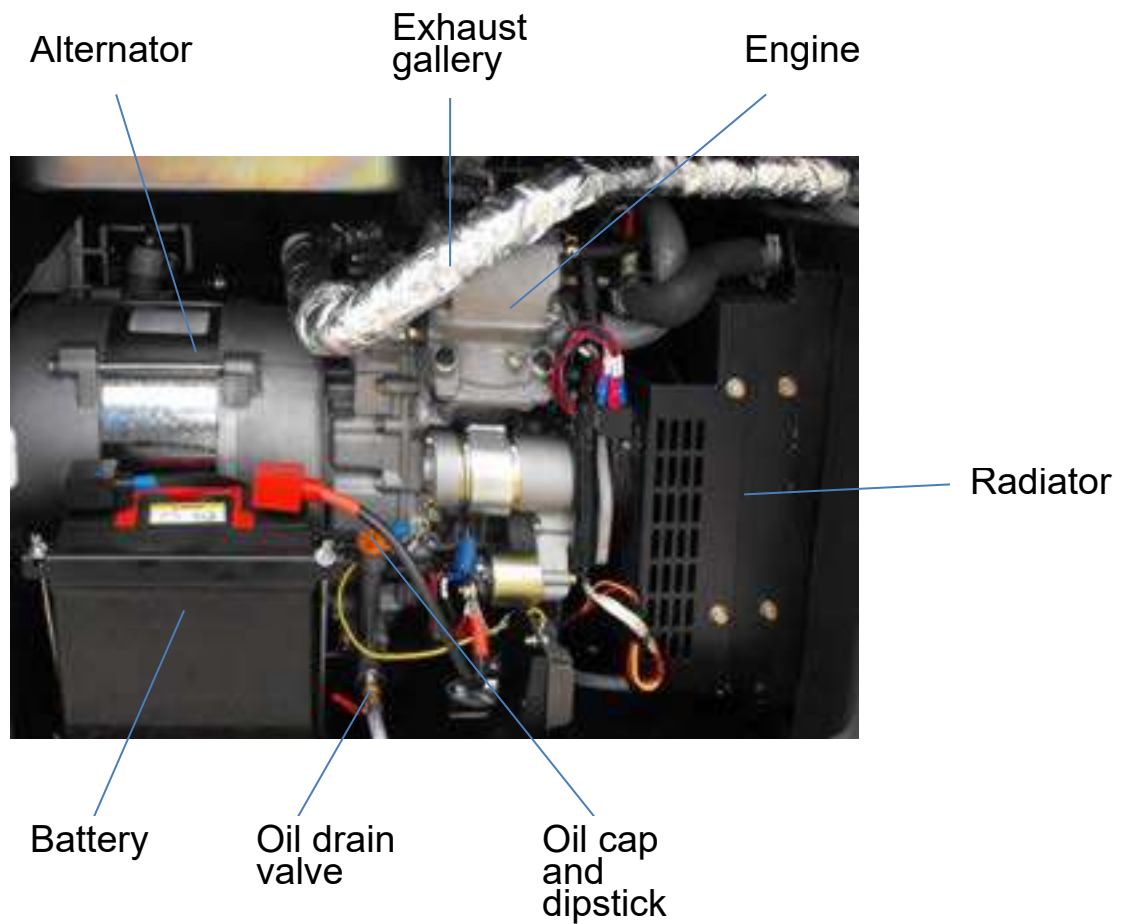
Air
filter



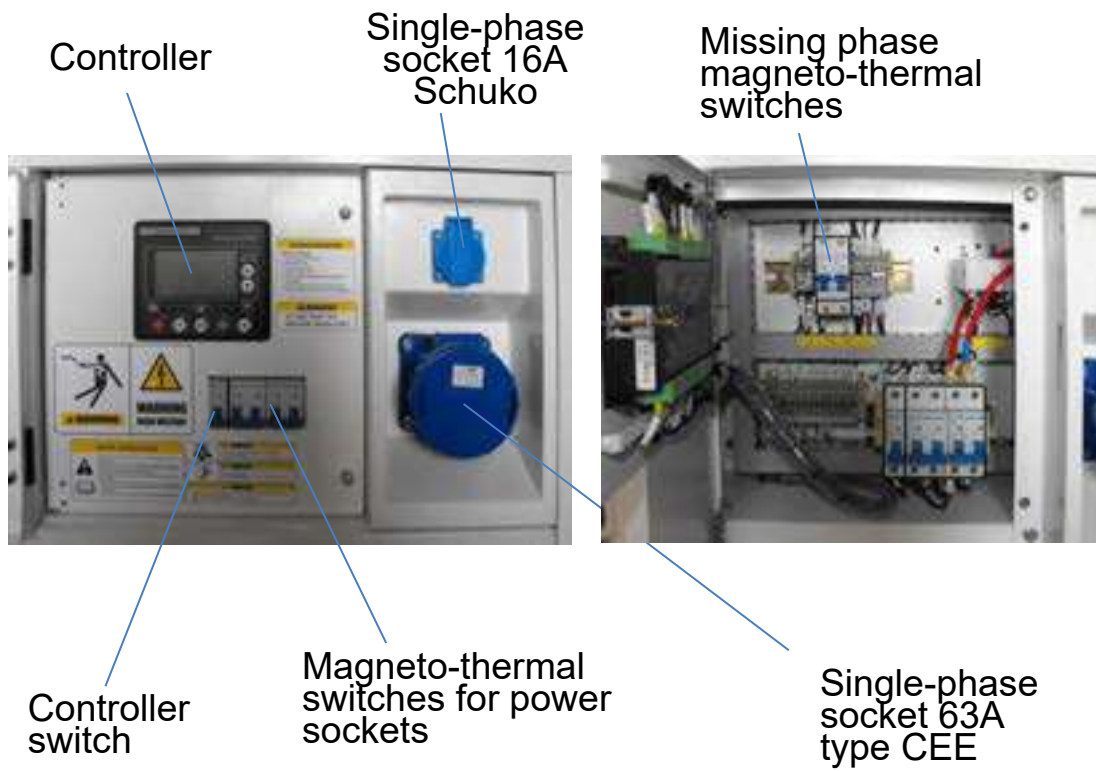
Expansion
tank

Vibration
damper

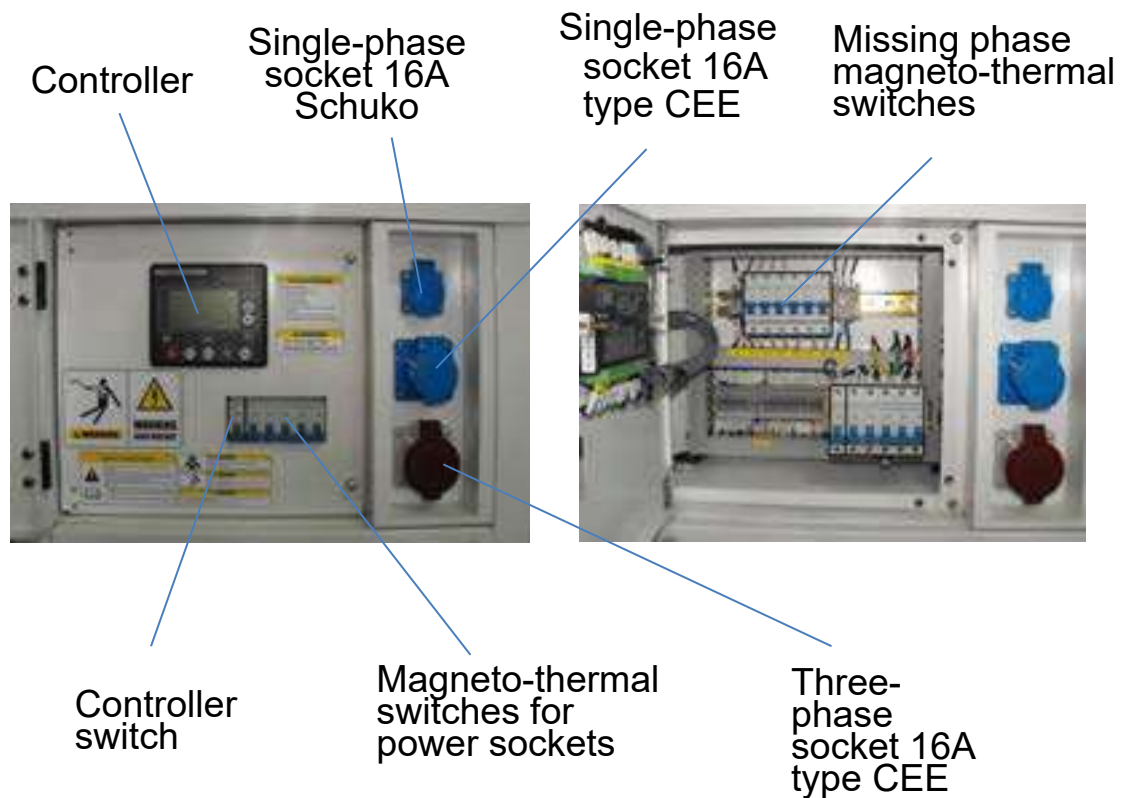
Oil
filter



AGT 10001 DSEA electric panel



AGT 12003 DSEA electric panel



6. TRANSPORT

The following precautions must be taken during the transport of the generator to ensure the safety of you and those nearby and to avoid damage to the equipment or its components:

- all transport operators must be performed only by qualified and trained personnel;
- all transport operations must be carried out with the engine switched off, all loads disconnected and all automatic or remote starting devices disconnected;
- during transport operations it is mandatory to use the personal protective equipment specified by the legislation in force.
- before driving, make sure that the fuel tank of the generator is not full, to avoid leakage.
- protect the generator from weather during transport. In case of rain or snow, cover the generator with a nylon foil. Since some engine components retain for a while after shutting down, wait at least half an hour after shutting down the engine before covering the generator;
- make sure that the movement area is free of any obstacles or impediments;
- do not install on the equipment any device or accessory not specified by the manufacturer and which may increase the mass or volume of the equipment;

- do not subject the generator to sudden movements during transport;
- make sure that the travel procedure does not exceed the time strictly necessary to reposition the equipment and do not leave the generator suspended for a long time;
- the use of points other than those indicated in this manual may cause damage to the equipment and injury to operators.

Generators sets can be transported with a forklift, with straps and chains, or in some specific cases with a low speed construction trailer. In the first case, make sure that the means of transport can lift the entire weight of the generator, as indicated in the technical data. Insert the fork of the truck under the generator only on the long side and make sure that it protrudes from the opposite side. Do not insert the fork of the truck on one of the short sides. In the second case, before starting the lifting, make sure that the points used for lifting are fixed correctly on the generator and that the lifting machine is suitable for lifting the complex mass of the generator, as indicated in the technical data. Make sure that the straps or chains used are suitable for lifting the complex mass of the generator as indicated in the technical data and check that they are not broken or damaged. In the above cases it is mandatory to move the generator in a horizontal position and with the lifting hook placed on top. If you want to move the generator on the road, install it on an approved trailer. Follow the specific instructions of the trailer manufacturer.

THE GENERATOR WILL BE INSTALLED ONLY BY QUALIFIED PERSONNEL AND IN ACCORDANCE WITH THE SAFETY RULES IN FORCE IN THE COUNTRY IN WHICH THE GENERATOR WILL OPERATE. INSTALLATION STAFF MUST KNOW AND APPLY THE SAFETY AND FIRE PREVENTION RULES IN FORCE BEFORE STARTING INSTALLING THE GENERATOR.

7. PRELIMINARY CHECKS

The generator set is intended for the production of electricity as a source of failure in the event of failure of the national electricity network or for commercial activities in locations where there is no temporary distribution network.

This generator set is not intended to replace the national electricity grid with continuous operation (24 hours a day) or together with solar panels, wind turbines or other alternative electricity generation systems.

Task analysis

Before starting up the equipment, carry out a careful analysis of the types and powers of the loads to be connected to the generator. The correct sizing of the generator in relation to the expected consumption is a mandatory condition to avoid the danger of damage to the connected devices or to the generator itself.

This analysis should normally be performed before purchasing the generator. If you are not in possession of such an analysis performed by qualified personnel (e.g. by design engineers for electrical installations) before putting the equipment into operation - obligatory to our technical service, providing all the data related to the tasks, as well as the series of the generator and the data of the distributor or supplier of the equipment.

In principle, the continuous power of the generator must be greater than the sum of the connected loads, applying the following correction factors for each type of load: 1 for resistive loads, 3 for electric motors or equipment that includes them, 1.5 for UPS, neon lamps, inverter welding machines or other nonlinear loads.

Analysis of environmental conditions

Once you have established that the type of loads to be connected is compatible with the purchased generator, you must make sure that the conditions of use are also suitable for the installation of the generator. In particular, the equipment must not be used indoors or in danger of explosion and must be placed at an appropriate distance (minimum 20 meters) from heat sources or liquid, or gaseous fuel tanks.

The generators are designed to operate away from bad weather (rain, snow, high humidity...) and dusty atmospheres.

It is also recommended that the generator not be exposed to direct sunlight, especially during the warmer months. This can ensure better cooling of the equipment and as a result maintain its rated power.

The nominal values of the operating conditions for which the equipment is designed and which represent the reference point for the characteristics entered in the technical data are the following:

Ambient temperature:	between -5°C and +25°C
Relative humidity:	between 0% and 35%
Atmospheric pressure:	1 bar
Altitude:	from 0 to 100 meters above sea level
Power factor for single-phase equipment:	$\cos\varphi = 1$
Power factor for three-phase equipment:	$\cos\varphi = 0,8$
Load type:	balanced, without distortion
Fuel type:	according to standard EN 590:1993
Tolerances:	+/- 5%

Changing these conditions causes changes in the operation of the generator. In particular, the increase in ambient temperature causes a power drop corresponding to a decrease of approximately 2% for every 5°C which exceeding 25°C.

Dropping the temperature below the 5°C set-point has no effect on power but affects engine start. In these cases, a series of adjustments must be made according to the actual operating temperature. Contact your distributor or our technical service for more information.

The increase in altitude means a thinning of the intake air and as a result, a loss of power corresponding to a decrease of 1% for every 100 meters.

Increasing humidity can cause insulation problems with alternator windings.

Variation of the power factor to values well below the nominal ones can cause a voltage drop and as a result can damage the connected loads.

The fuel used must be high quality diesel for motor vehicles, correctly stored and without water particles or other liquids. The use of bio-fuels is prohibited.

The use of fuels, other than those recommended or contaminated will void the warranty.

Note that the power values specified in the technical data are only reached after the complete running-in of the equipment after 50 hours of operations. During running-in, do not exceed the use of 75% of the declared power under the actual operating conditions.

In the case of installation in closed spaces, European regulations provide a series of safety conditions more restrictive than the installation in open places, but at a purely technical level it is necessary to ensure correct ventilation and adequate exhaust fumes. In case of installation in an enclosed room, contact our technical service and present the main data of the respective space (room dimensions, dimensions and position of the windows...) or a plan of the room.

Our specialists will provide you with all the information necessary for a correct installation.

Warning!!! Installing the generator in an enclosed space without prior authorization will void the warranty.

Safety systems analysis

On the right side of the electrical panel is a red mushroom emergency button. In the event of any type of danger, pressing this button guarantees the immediate shutdown of the equipment.

It is recommended to place a fire extinguisher in the immediate vicinity in case of fire danger.

8. INSTALLATION

Removing the packaging

The generator set is delivered fully packaged to avoid damage during transport. Before installation, remove the nylon protection or cardboard box, without throwing them in the environment but handing them over to a collection center according to local regulations.

It is very important to remove all packaging completely as it may impede proper ventilation and exhaust fumes, as a result of which there is a high risk of damage to the generator.

Identification of documentation and accessories

Make sure you have the operating instructions for the motor, controller, and mounting accessories.

Normally, the documentation is on the case but for transport reasons it can also be placed inside.

Check the authorized service centers in your area immediately. If you do not find information or if there are no support centers in your area, contact your dealer for detailed information.

After identifying the most convenient service center for your requirements, write down your contact details on the "NOTES" page at the end of this manual.

Positioning

Place the generator on a sufficiently rigid flat surface (remove the wooden pallet on which it is delivered), insulated from other structures and able to support the entire mass of the equipment. When laying on a cement surface, it is recommended to install dampers under the generator feet to reduce the vibration of the sheet metal components and to reduce noise.

Roof

If you install a roof over the generator to protect it from environmental factors, follow these recommendations:

- ensure proper ventilation of the equipment, without clogging the suction and exhaust grilles;
- ensure the evacuation of exhaust gases through flexible extension tubes, resistant to high temperatures, outside the built protection;
- make sure that the materials from which the roof is made are not flammable, in order to avoid fires;
- before starting the engine, remove any plastic tarpaulins used to protect the equipment from the weather.

Fuel supply

Check the fuel level in the tank with the inspection tool next to the cap or directly through the cap and refill if necessary, using a clean container with no traces of other liquids.

Take all necessary measures to avoid spilling fuel on the ground and polluting the environment.

Do not exceed the maximum level of the tank and do not allow fuel to drain from it. After completing the operation, close the tank cap tightly and wipe off any small fuel leaks with a clean cloth.

Warning !!!

Use only fresh fuel. Fuel kept in canisters for a long time produces sediment that can damage the engine. Do not use special additives or fluids to start the engine as they may damage the gaskets and other rubber parts.

Danger !!!

- Refuel only with the engine switched off.
- Do not smoke or approach with open flame during refueling.
- Refuel only in well-ventilated areas.

Checking the oil and fluid level in the radiator

Open the appropriate panels on the housing for access to the dipstick and radiator cap.

Follow the engine manufacturer's instructions in the engine manual to check the oil level and top up if necessary.

Warning!!!

Poor or used quality oil can cause engine problems and shorten its life. Change the oil if it is contaminated or after the number of hours in the maintenance table.

Checking the battery

Disconnect the ground wire (-) before checking the electrical installation.

An accidental short circuit can cause a fire.

Provide adequate ventilation around the battery.

Ventilate the area around the battery and keep any source of fire at bay.

During operation and charging, the battery generates hydrogen, which can ignite.

Battery electrolyte

Avoid contact of the eyes and skin with the battery electrolyte, which is a very strong acid and can injure you. Wash immediately with plenty of clean water.

Check battery electrolyte level (maintenance only).

If the electrolyte level is close to the lower limit, fill to the upper limit. Insufficient electrolyte shortens battery life and leads to explosion due to overheating.

The electrolyte level tends to drop faster in summer. Check the level more often during this period and top up with distilled water.

If the engine engagement is slower than normal and the starter fails, recharge the battery. If the engine does not start even after the battery is recharging the battery, replace the battery.

Visual inspection for leaks

Check that there is no leakage of liquid on the surface on which the equipment is placed. In the event of a leak, contact your dealer, manufacturer or service center.

Visual inspection of ventilation grilles

Check that the ventilation grilles (suction and exhaust) are not blocked. Remove any leaves or other foreign matter that may clog the vents before starting the engine.

Exhaust check

Check that the exhaust pipe is not pointing at an obstacle or that it is at least 2 meters from the pipe.

Checking the integrity of the housing

Check that all doors and panels are installed correctly and tightly closed. Starting the equipment with the doors open can adversely affect cooling/ventilation, increase the noise level and injure the operator.

Checking the switches

Check that the power switches and auxiliary switches are in the OFF position. Otherwise open the protective cover and move the lever from the ON position to the OFF position.

Grounding

Before starting up the generator, the connection must be made with a cable with a corresponding section between the earthing terminal on the electrical panel (or on the housing) marked with the letters GND and stake stuck in the ground near the generator, according to current regulations. The cable cross section must be dimensioned according to the power of the generator and the distance at which the stake is located. Neither the ground terminal nor the cable are supplied as standard.

For the safety of operators and electronic components it is mandatory to install a differential protection or an insulation monitoring device. These protections are not supplied as standard because they are normally already mounted in the general electrical panel of the electrical installation to which the generator is to be connected.

When connecting the generator to an electrical installation with a residual current circuit breaker or an insulation monitoring device, the alternator null must be grounded for the differential protection to be active.

If the use of the generator does not require its connection to an electrical installation equipped with a residual current circuit breaker, provide this protection on board the generator.

However, it is recommended to contact our technical service to specify the connections to be made.

Warning!!!

The manufacturer is not liable for any damage caused by failure to ground the installation or incorrect connection of the differential protection.

Warning!!!

Under no circumstances use the ground terminal as a negative terminal to start the generator with an external battery. This operation damages the internal wiring (in some cases it can cause fires) and leads to the loss of the equipment warranty.

Connecting the load

Considering that the load analysis has been performed according to the instructions above and that the type of load to be applied is compatible with the characteristics of the generator, connect the load to the socket on the generator electrical panel (in the case of electrical panels with sockets) or connection for load.

Warning!!!

Never connect the generator directly to the mains or in parallel with another generator. This operation can cause serious damage to the generator set and/or connected loads.

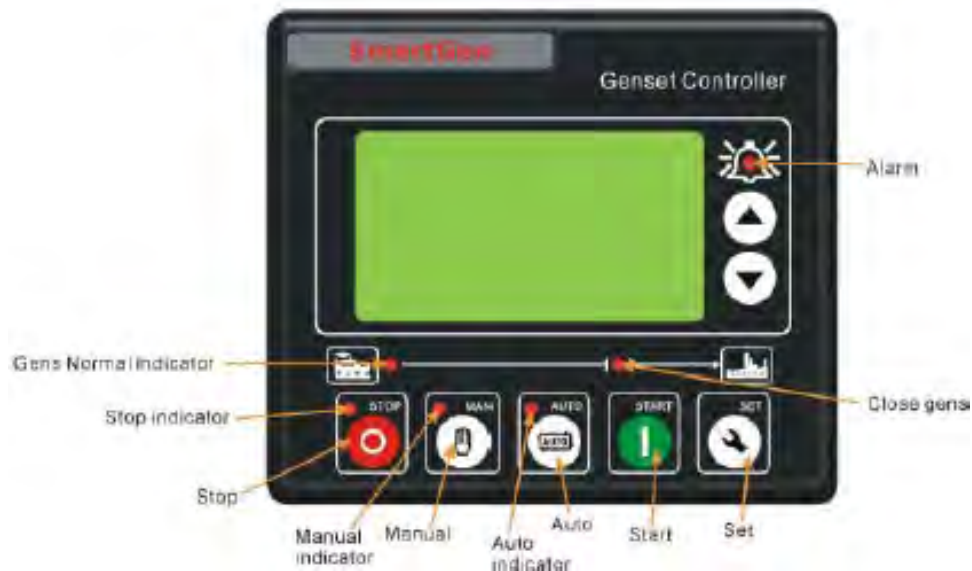
Warning!!!

Alternatively, the generator can be connected to the mains via a switchboard (available separately).

The switch panel must be installed by a professional electrician based on the diagrams and instructions on the panel.

9. USE


9.1 Layout of the control panel



9.2 Instruction of buttons

	Stop/ Reset	Stop running generator in Auto/Manual mode; In case of alarm condition, pressing the button will reset alarm; In stop mode, pressing and holding the button for 3 seconds will test indicator lights (lamp test); During stopping process, press this button again to stop generator immediately.
	Start	Start genset in Manual/Test mode.
	Manual	Pressing this key will set the module into manual mode. Pressing and (or) simultaneously can adjust LCD contrast.
	Auto	Pressing this key will set the module into auto mode.
	Set/Confirm	Pressing this key will enter into Main Menu; In setting parameter status, press this key will shift cursor or confirm setting value.
	Up/Increase	Scrolls the screen up; Shift the cursor up or increase the set value in parameter setting menu.
	Down/Decrease	Scrolls the screen down; Shift the cursor down or decrease the set value in parameter setting menu.

9.3 Automatic start/stop operation

Auto model is selected by pressing the  button; a LED besides the button will illuminate to confirm the operation.

9.3.1 Automatic start

When "Remote Start" is active, "Start Delay" timer is initiated;

"Start Delay" countdown will be displayed on LCD;

When start delay is over, preheat relay energizes (if configured), "preheat delay XXs" information will be displayed on LCD;

After the above delay, the Fuel Relay is energized, and then one second later, the Start Relay is engaged. The engine is cranked for a pre-set time. If the engine fails to fire during this cranking attempt then the fuel relay and start relay are disengaged for the pre-set rest period; "crank rest time" begins and wait for the next crank attempt. Should this start sequence continue beyond the set number of attempts, the start sequence will be terminated, the fourth line of LCD display will be highlighted with black and Fail to Start fault will be displayed.

In case of successful crank attempt, the "Safety On" timer is activated, allowing Low Oil Pressure, High Temperature, Under speed, Charge Alternator Failure and Auxiliary inputs (configured) to stabilise without triggering the fault. As soon as this delay is over, "start idle" delay is initiated (if configured).

During "start idle" delay, under speed, under frequency, under voltage alarms are inhibited. When this delay is over, "warming up" delay is initiated (if configured).

After the "warming up" delay, if generator status is normal, its indicator will be illuminated. If generator voltage and frequency have reached on-load requirements, then the generator close relay will be energized; genset will take load; generator power indicator will illuminate and generator will enter into Normal Running status. If voltage or frequency is abnormal, the controller will initiate shutdown alarm (alarm information will be displayed on LCD).

9.3.2 Automatic stop

When the "Remote Start" signal is removed, the Stop Delay is initiated.

Once this "stop delay" has expired, the Generator Breaker will open and the "Cooling Delay" is then initiated. After "Transfer Delay", the mains close relay will be energized; mains will take load; generator power indicator will extinguish while mains power indicator will illuminate.



During "Stop Idle" Delay (if configured), idle relay is energized.

"ETS Solenoid Hold" begins, ETS relay is energized while fuel relay is de-energized.


"Fail to Stop Delay" begins, complete stop is detected automatically.

Generator is placed into its standby mode after its complete stop. Otherwise, fail to stop alarm is initiated and the corresponding alarm information is displayed on LCD.

9.4 Manual start/stop

Manual mode is selected by pressing the  button; a LED besides the button will illuminate to confirm the operation; Then press  button to start the generator, it can automatically judge crank success and accelerate to high speed running. If high temperature, low oil pressure, over speed and abnormal voltage occur during genset running, controller can effectively protect genset to stop.

After genset high speed normal running, controller will send Gen Closed signal.

Manual stop: pressing  key can stop the running genset.

10. RUNNING THE GENERATOR

10.1 Pre-start preparation

Implement pre-start preparations in the following order upon preliminary use.

10.1.1 Fill fuel

Recommended fuel type:

GB/T252-1994 light diesel 0# in summer, -10#, -20#, -30# in winter

- Fill the proper fuel. Improper fuel may lead to risk of fire. Please confirm the type of fuel in advance.
- Clean any overflowed fuel. Don't start the engine before cleaning.
- In order to prevent any overflow when machine is running, fill-in amount shall be approximately 90% of tank volume.

10.1.2 Fill lubricant

Keep lubricant level between upper and lower scale marks. Lubricant level shall not exceed the upper mark (H). Ejection of lubricant from the breather hole may cause engine errors.

- a. Keep engine level when filling in lubricant.
- b. Take off the black cover of lubricant inlet on the top of gear chamber. Add recommended lubricant up to the upper mark (H) of oil gauge.
- c. Measure the lubricant with oil gauge. In order to get correct level, please clean the oil gauge before inserting it into lubricant. Lubricant trace remaining on the oil gauge indicates measurement.
- d. Re-confirm it after 3-5min running.

10.1.3 Fill cooling water

Close the radiator water inlet cover tightly.

Otherwise, ejected steam or hot water may cause scalding.

Add cooling water as per following procedures. Please add anti-freezing liquid into cooling water.

- Fill water into radiator
 - a. Turn the radiator anticlockwise and take it off.
 - b. Add the cooling water till it overflows from radiator water inlet. Slowly fill cooling water to avoid any foam.
 - c. Close the radiator cover tightly to prevent any water leakage. Direct the inside clip towards notch of water inlet. Then press down the cover and turn the cover

towards right side for 1/3 cycle to close the cover.

- Fill water into overflow bucket of auxiliary tank

d. Please take off the water inlet cover of auxiliary tank. Add cooling water up to the upper scale mark. Then re-mount the cover.

e. Check if joints of rubber hoses connecting auxiliary tank and radiator are loose, released or damaged. If any, please repair or change them to avoid cooling water leakage.

10.2 Trial running

Run the generator that is new or idle for long term at low speed and without load for short term before load running. Deliver the lubricant to all abrasion parts. If one starts the load running without the operation mentioned, it may cause abnormal abrasion or damage to piston, cylinder sleeve, crank shaft, bearing and other parts.

a. Check if any abnormal sound or leakage of water, oil or gas.

b. Reconfirm the quantity of lubricant and cooling water.

Please re-confirm the quantity of lubricant and cooling water after 5-minute trial running, if lubricant or cooling water is filled for the first time or is replaced.

Trial running distributes lubricant and cooling water around the machine. During re-check, the level of lubricant and cooling water shall be lower. By then, please make up for insufficiency.

- Fill in lubricant (refer to 10.1.2)
- Fill in cooling water (refer to 10.1.3)

10.3 Running

Following parts in the running generator are extremely dangerous, such as radiator fan, belt, engine, cylinder hood, exhaust pipe, muffle and other parts at high temperature and high voltage.

- Close the side door of running machine.
- Stop running machine before check and maintenance.

Run the machine with all instruments on the operation panel.

10.3.1 Pre-start checks

Carry on following checks prior to each start.

1) Remove foreign matters in the generator

- Check if there is any tool or rag in the generator.

- Check if there is any rubbish or inflammable matter around muffle or engine. If any, remove it away immediately.
- Check if suction inlet and exhaust vent of generator is jammed by rubbish or rag. If any, remove it away immediately.

2) Check in the generator

- Any oil leakage in the engine
- Any fuel leakage in the fuel system
- Any water leakage in cooling water system
- Broken distribution line, short circuit or loose joint
- Check if any screw is loose or released

Do not run the machine before eliminating any founded abnormality.

3) Check and fill fuel

Regularly check rest fuel level in the fuel tank and add recommended fuel on time (refer to 10.1.1).

4) Check and fill lubricant

- Check lubricant level with oil gauge.
- Add recommended diesel lubricant from oil-inlet of gear chamber when oil level is insufficient.

Check the lubricant with oil gauge. Add lubricant up to upper scale mark with check (refer to 10.1.2).

5) Check and fill cooling water



Generator is still hot when machine is running or after machine stops. In such case, do not open the water inlet cover of radiator because ejected steam and hot water are extremely dangerous. As temperature falls down, envelop the cover of water inlet of radiator with cloth. Then open the cover. Remove the water inlet cover after releasing the inner pressure.

Check and fill the cooling water before running the machine when the engine is cool.



【Attended operation】

Check quantity of cooling water

Confirm and check the quantity of cooling water by level in the auxiliary tank.

If water level is between the upper and lower scale marks, it means normal.

Check if there is any change of water level prior to use of machine every day.

- Normal change of water level

Prior to running (cold status): low level

After stop (high-temperature status): upper level

Open the radiator cover. Check and add cooling water if there is no change of water level after running compared with that prior to running. In addition, check rubber hoses connecting radiator cover and auxiliary tank. Confirm if any connection is released, loose or broken.

6) Check special earth of generator

Confirm if special earth for generator body, leakage alarm and earth of loading equipments work properly.

Please do not connect N-phase of 3-phase joint directly to earth line.

10.3.2 Adjustment upon start and no-load



- If the breaker at side of generator and loading equipments are at ON, please do not start the machine. Power is supplied to loading equipments and running machine suddenly will lead to damage. And it may cause electric shock or errors of loading equipments.

1) Start the machine at normal temperature

Start the machine in the following order

a. Confirm breaker at side of generator and loading equipments at OFF.

b. Insert the start key and turn it to ON. Indication lamp of intelligent display is on. Please confirm it.

2) Adjustment of frequency and voltage

Make adjustment after machine is heated and runs.

Heat the machine for about 5 minutes (no-load).

a. Adjust the regulating screw rod of oil-pump till frequency is up to rated value.

b. Adjust the voltage with voltmeter as per specification.

3) Run at low load



Prevent running the generator for long time at low load.

- It is allowed to run the generator for long time, only when the load is up to or above 1/4 of full load.
- It is prohibited to run the generator for more than 5 hours, when the load is only 1/8 to 1/4 of full load.

Running the generator for long time at low load will cause carbon deposit on the engine and exhaust pipe, thus reducing the engine performance.

10.3.3 Keynote for load running

1) Pre-running check

a. Confirm that voltage, current and frequency shown in the intelligent panel are normal.

b. Check the environment of engine.

- Check the color of exhaust

Colorless or light gray: Normal

Black: Abnormal (insufficient combustion)

Blue: Abnormal (Combustion of lubricant)

White: Abnormal (No combustion of fuel or too much water contained in the fuel)

- Check the sound, running state and vibration
- Check leakage of fuel, lubricant and cooling water
- Check if breaker at the side of loading equipments is at OFF
- Turn the 3-phase breaker of generator to ON.

2) Load conditions

【Attended operation】

Forbid increasing or decreasing speed rapidly, over-load or other unreasonable operation during the first 50 hours for new engine.

a. Turn the breaker to ON

b. Turn the breaker at the side of loading equipments to ON

3) Adjustment during running

a. Adjust the rotating speed, frequency and voltage according to load.

4) Checks during running

【Attended operation】

If the generator produces any abnormal sound, please stop running it

immediately for check and repair. If one continues to run machine at abnormal status, unexpected serious accidents may occur.

Check if there is any abnormality of the generator (check the conditions below).

a. Check all instruments and central indication lamps

Check voltage, current and frequency in accordance with specifications. Check if indication lamps are on.

b. Check the color of exhaust

Colorless or light gray: Normal

Black: Abnormal (insufficient combustion)

Blue: Abnormal (Combustion of lubricant)

c. Check abnormal sound and vibration

d. Check leakage of fuel, lubricant or cooling water

e. Check the rest fuel level

If fuel supply is interrupted during machine running, please eliminate air remaining in the fuel pipe after fuel fill-in.

10.4 Stop operation

Stop running the generator in following orders:

a. Turn off the breaker of loading equipment

b. Turn off the breaker of generator.

c. Run the generator for 5 minutes at zero load.

d. Turn off the starting switch key to stop the engine.

e. Pull out the key and keep it safely.

【Attended operation】

Never stop the engine emergently. Otherwise, the temperature of engine parts will rise rapidly, resulting in damage or scuffing of cylinder.

11. PERIODICAL MAINTENANCE AND SERVICE



Carry out periodic check

Aging and poorer performance appear if engine runs for long time. Accident and error may occur if there is no check, maintenance or service, causing great consumption of fuel, bad exhaust and large noise. What's more, the service life of engine becomes shorter.

Routine and periodic check and maintenance can effectively avoid error and accidents. In addition, periodic check on electrical system can avoid electric shock.



Electric shock

Never check or maintain the generator until it is completely stopped with the breaker cut off.



Please observe pre-start checks

Implement routine and periodic check before working it every day. It is a good practice to do routine check before machine starts every day.
(Refer to 6.1 for keynotes about check before work).



Please use the original parts

Replace the damaged parts with our original parts.
Otherwise, the mechanical performance falls or duration of engine turns shorter.



Warning label for maintenance

During checking or maintaining the generator, identify the warning label 'DANGER NOT RUN' at obvious positions, such as starting switch, in order to avoid unnecessary persons carry out unintended operation.



Protective clothing

- Wear the protective clothing and use safe tools when servicing the generator.
- Don't wear the tie or loose clothing. Otherwise, it will catch the unit and cause an unexpected accident

The handling of wasted water

- When handling the wasted fuel, please use the container.
- Wasted fuel pollute environment, so don't pour them into stream, ocean or lake.
- To handle poisonous engine oil, fuel, cooling water and battery, please refer to the related regulations.



Periodic check as per running record

Establish the running record for daily operation, maintenance and check. Periodic check is divided into several intervals like 50 hours, 250 hours, 500 hours, 750 hours and 1000 hours.

11.1 Check period

Check for initial 50 hours:

- Replace engine oil
- Replace engine oil filter element
- Check the fan belt tension

Check for every 250 hours:

- Replace engine oil
- Replace engine oil filter element
- Clean air cleaner
- Measure insulation resistance of the generator.(Once for a month)
- Check specific gravity of the battery electrolyte.

Check for every 500 hours:

- Replace the fuel filter element
- Clean the radiator

- Check the electrical circuit terminal & wiring connector
- Cooperating with the check every 250 hours.

Check for the 1000 hours

- Clean inner part of the fuel tank
- Replace air cleaner element
- Adjust fuel injection time
- Check anti-vibration rubber
- Check the nylon tube & rubber tube
- Check sound absorber
- Cooperate with the check every 250 hours and check every 500 hours.

Refer to engine operation manual for the details

11.1.1 Check for the initial 50 hours

(1) Replace engine oil

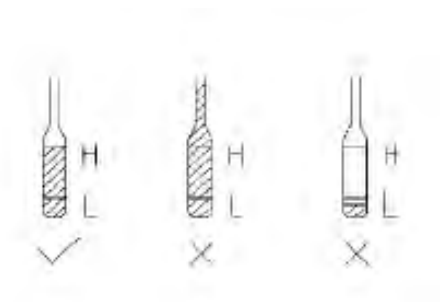
Replace engine oil in 50 Hrs for the first time, after the second time, replace it in 250 Hrs.

a. Remove oil drain bolt, drain oil empty, and run the engine for 3-5 minutes. It is easy to drain oil out, if the engine warms.

b. After that, recover the oil drain bolt and tighten.

c. If it is new oil, please fill it with filling pipe. Fill under the upper lever.

d. Run engine for a few minutes after filling engine oil, and check oil position (between the position H and L).



(2) Replace engine oil filter element.

Remove the oil filter with special wrench.

Clear the filter installation end.

Smear thin lubricant on the seal gasket.

Screw on the filter with hands and then tighten it with the special wrench securely.

11.1.2 Check for every 250 hours.

(1) Replace engine oil

Replace for every 250 Hrs

(2) Replace oil filter element

Replace for every 250 Hrs

The maintenance time should be shortened in the case of dusty areas.

Before replacing spring gasket, it is upturned. Remove the oil drain bolt and drain out the oil.

a. Remove element by oil cleaner wrench.

b. Clean element, spread oil film on the spring gasket surface.

Install it with oil cleaner wrench, connect surface with oil cleaner gasket, and tighten it.

c. Run engine for a while after replacing the element. Check oil position. Be sure oil position is between the position H and L

d. Concerning oil filter spring gasket, you can consult manufacturer and diesel engine operation manual.

(3) Clean air filter element

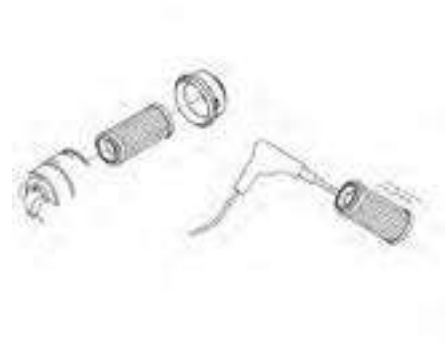
Refer to diesel engine operation manual.

When dry dust clag on element, please remove the element and blow it with dry, clean compressed air.

■ Check the element. If it has been scathed, replace it.

■ Install air filter, and clean it.

(4) Check the insulation resistance



Electric Shock

■ Check insulation resistance after stopping the engine.

■ Don't measure the insulation resistance until disconnecting the connection wire of AVR or controller. Otherwise, they will be severely damaged.

Measure the insulation resistance once a month by using 500V insulating-resistance meter. Check if it is above 1MΩ.

Measurement:

Disassemble the three-phase cable, and turn breaker to ON.

Measure the insulation resistance between output terminal and engine frame. It is possible for electricity leakage or fire hazard when the insulation resistance is lower than 1MΩ. Clean and dry output terminal, breaker, and cable. Consult with dealer for any question.

11.1.3 Check for every 500 Hrs

Check for every 500 Hrs should cooperate with check for every 250 Hrs.

(1) Check spring gasket of fuel filter.

a. Screw off the fuel filter by filter wrench, and take off the spring gasket.

b. Clean filter and daub slim engine oil on filter surface, then install it.

Don't screw too tightly.

c. Eliminate the air of fuel pipe, after replacing spring gasket.

(Refer to the engine operation manual for the manufacturer and model of spring gasket)

(2) Clean radiator

Please clean the radiator orifice by using steam or high-pressure air.

(3) Check circuit terminal and connection terminal. Check if there is rust and burnout in main and vice circuitry

11.1.4 Check every 1000Hrs

Check for every 1000 Hrs should cooperate with check for every 250,500 Hrs.

(1) Clean the fuel tank

Eliminate the sediment and water in the fuel tank.

(2) Replace the air filter element

Refer to the relative item.

(Consult the agent for the manufacturer and model of air filter)

(3) Check anti-vibration material

If the shockproof material is damaged or distorted, you can consult the agent.

(4) Check the nylon tube & rubber tube

If the nylon tube & rubber tube is vulcanized or of bad quality, you can consult the agent to change it.

(5) Check sound absorber.

If sound absorber looks aged obviously or it has been peeled, you can consult the agent.



Periodic replacement of important parts

- Be sure to periodically replace the parts which may cause fire hazard due to aging or damage.
- Replace the parts of fuel system, fuel pipe and fuel tank cover every two years or 4000 hours, whenever there is any abnormality.
- Replace the air filter element, fuel filter element and oil filter element periodically. Otherwise, the engine may be damaged, reducing its useful life.

11.2 Periodic check and service schedule

Routine and periodic checks are extremely important for maintaining good conditions of generator.

【Attended operation】

Establish the periodic check plan in order not to miss any required check.

Neglect or ignore will lead to errors or shorter duration, even electric shock.

Professional technology and skills are needed for check and maintenance whose check interval is over 1000 hours. Please consult the sales department or the dealers.

◇Check and clean ● Replace

	Check & service item	Daily check	50 hrs	250 hrs	500 hrs	1000 hrs
Engine	Check engine oil	◇				
	Check the cooling water	◇				
	Check fan belt	◇				
	Check fuel, drain out sediment and impurity	◇		◇		
	Check battery electrolyte	◇				
	Check for water or oil leakage	◇				
	Check the loosen assembly	◇				
	Check the exhaust color	◇				
	Check meters and warning light	◇				
	Replace engine oil			●		
	Replace oil filter element		☆First	●		
	Clean air cleaner element		☆First	◇		
	Check battery electrolyte density			◇		
	Clean the radiator				◇	
	Replace seal ring of fuel filter				●	
	Clean the inner of the fuel tank					◇
	Replace the air cleaner element					●
	*Check valve clearance			☆First		◇
	*Adjust fuel nozzle					◇
	*Check fuel injection time					◇
	*Check damper rubber					◇
	Check the nylon tube & rubber tube					◇
	Check sound- absorbed material					◇
Generator	Check if the relay can work	◇				
	Check protection for electrical leakage	◇				
	Measure insulated resistance			◇		
	Check circuit terminal and connection				◇	

Note: The item with "*" Mark, you can consult the agent/dealer.

The item with "☆" mark indicates time for the initial check.

Refer to different type of the engine; check time is a little different.

Relative manual reading is required.

12. TROUBLESHOOTING

【Attended operation】

Immediately stop the running generator for check and repair if any abnormality is found.

To continue running the abnormal generator may cause unexpected serious accidents.



Rotating Part

It's very dangerous to touch the rotating parts in the generator.

- Stop the engine to service and maintain the inner parts of the unit.
- The cooling fan of the radiator will go on rotating after stopping the engine for a while. Don't service the electric fan until it stops entirely.



Electric shock

- Don't touch the inner parts with high voltage during the running.
- Stop the engine and disconnect the breaker to service and maintain the inner structure.



Hot Part

It's very dangerous to touch the hot parts in the generator.

- Stop the engine to service and maintain the inner parts of the unit.
- The machine keeps hot after stopping the engine for a while. Don't service the machine until it totally cools down.



The Usage of the Battery

- It will explode and cause a severe accident if the battery is used in a wrong way.
- Remove the negative terminal when servicing the generator.

Engine can not start	Start motor doesn't run or its speed is so slow.	Battery leakage	liquid measure
		Battery unclamped or rusted	Install after cleaning
		The earth terminal is imperfect	Repair
		Fuse disconnection	Replace
		Start switch badness	Replace
		Starter badness	Replace
		The wire breaks	Repair
	Engine can't start while starter is running.	Speed handle lever trouble	Repair
		No fuel oil	Fill oil
		Fuel oil cleaner walled up	Clean , and replace fuel oil cleaner
		Air in the oil pipe	Empty air
		Fuel winding does not work	Check the fuse, if disconnection, replace it, check and replace winding if necessary
	Ambient temperature is very low.	Fuel is frozen.	Use JIS-3 oil, or choose the applicable viscosity oil according to the freeze area
		Some water accumulated in the fuel system is frozen	Heat, empty fuel oil tank ,fuel oil cleaner and water in oil pipe
	The engine stops automatically. And the rotating speed can't reach the rated speed.	Bad Air around pipe	Empty air
		Fuel oil cleaner walled up	Replace fuel oil cleaner element, clean or replace filter
		Compression leakage	Mend the engine
		Air cleaner is clogged.	Replace air cleaner element

Fault		Reason	Solution
Engine stops because of low oil pressure		engine oil is not enough	Fill engine oil
		Badness oil switch	Replace switch
		Engine air cleaner walled up	Replace filter
Engine can't reach the highest rotary speed		Badness regulator lever	Adjust to short
		Air in the oil pipe	Eliminate air
Zero load speed is too high		Regulator lever regulates badly	Adjust regulator lever to get longer
Slow zero load speed		Regulate pole to regulates badly	Adjust regulator lever to get shorter
		Air in the oil pipe	Eliminate air
Vibration is too big.		Not fix tightly	Fix tightly
Abnormal noise	Engine	Abnormal voice	Mend
	Generator	Bad axletree	Replace
		fasten bolt loose	Tight
	Engine shell	Abnormal voice	Mend
	Electrical fan	Abnormal voice	Mend

Over hot	Check around	Move thing
	If cooling-water lacked	Check if cooling water lacked
	Fan strap loose s	Maintain fan strap
	Radiator cooling orifice walled up	Clean radiator cooled part
	Thermostat abnormal	Maintain thermostat
	Electrical fan abnormal	Check and replace fuse
	Electrical fan abnormal	Check and mend receptacle guarder

Fault	Reason	Solution
The voltage value is not right or there is no voltage.	Bad voltmeter	Replace
	Bad AVR	Consult with dealer
	ZNR is burnt	
	Rotary rectifier is burnt	
	Rotor circuitry break	
	Engine circuitry is burnt	
The generator can't reach rated voltage.	Bad voltmeter	Replace
	Bad AVR	Consult with dealer
	Bad VR	
	Rotary rectifier is burnt	
	ZNR is burnt	
	Generator cable is burnt	
	Rotation speed is too low	Increase the speed
Over voltage	Bad voltmeter	Replace
	Bad AVR	Consult with dealer
	Bad VR	
Voltage decreases too much when connected with load.	Rotary rectifier is burnt	Consult with dealer
	Bad AVR	
	Load is not equal	Make them equal.
Breaker can't work.	Bad breaker	Consult with dealer
	Bad breaker	
	Load circuitry is shorted	Check

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