AYERBE

· *DIESEL GENERATING SETS 1.500 r.p.m.*

AYERBE INDUSTRIAL DE MOTORES, S.A.

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GENERAL

Thanks for choosing an AYERBE genset and joining the group of customers that enjoy our services.

We invite you to read carefully the following instructions, and the ones corresponding to the engine, alternator or any other device fitted in your machine. This handbook and the ones from the engine and alternator have information needed to operate the machine. If you follow all the instructions your machine will have a long satisfactory life.

At AYERBE INDUSTRIAL DE MOTORES, S.A. we are always at your service before or after buying your generator, so don't hesitate to contact us.

WARRANTY

In general our machines have 1 year or 2000 hours of warranty, what first occurred, otherwise specified.

To maintain warranty and obtain a good operation of the machine you should follow the instruction of this and the rest of handbooks, though that the wrong or non-execution of some operations can lead to cancel warranty.

Usually the engine manufacturer performs the engine warranty and the one of the alternator is performed by its manufacturer. AYERBE warrants the combined set. Anyway AYERBE will manage any work that has to be done in the genset, doesn't matter if corresponds to us or the engine or alternator manufacturer, but at the end the engine and alternator manufacturers can assume or not the warranty of the engine or alternator with their own independent criteria.

Modifications in the machine, bad operation or maintenance can lead to invalidate warranty.

The warranty includes faulty parts and workhand but not displacement or any damage direct or indirect due to the fault or no operation of the machine.

MACHINE DESCRIPTION

AYERBE gensets are basically compounded by propeller diesel engine, alternator and installation. They are available in standard, capsulated and soundproof, static o mobile, manual or automatic version.

The diesel engine can be of one of several marks included in our catalogue, water, oil or air cooled, direct or indirect injection and 1500 or 3000 r.p.m. The alternator is normally assembled to the engine by direct joining via SAE discs.

The monoblock lies on the base frame over rubber supports to absorb vibrations. The base frame includes fuel tank for at least 8 hours operation of the genset.

The alternator is 400/230 Vac three phases with star connection, 50 Hz, 2 or 4 poles, IP21, isolation class H, fulfilling directives CE 2014/35, CE 2014/30 and posterior modifications about

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security, and the directives about electromagnetic compatibility. For more information about the alternator see its manual. On request we can install any other kind of alternator. The pieces of the chassis are done in steel sheet of 2 mm thickness, punched, folded, electrically welded and screwed in the main parts to achieve a good access to the interior of the machine. The sheet is optimally cleaned and treated for its posterior painting.

In soundproof gensets the capsulate is formed by a modular structure made with isolating panels, covered by isolating glass fiber and perforate steel sheet, To obtain a good noise level reduction and fire resistance. The capsulate is provided with inlet and outlet collectors dimensioned to the refrigeration needs of the Generator. The capsulated gensets but not soundproof have the same chassis but they haven't the isolating layer.

The set fulfils the European Community directives about machinery security CEE 89/392, 73/223, 89/336 and posteriors modifications, so they haven't got risks for the operator, if they are installed, used and maintained, according to the instructions with the condition that the security and protection devices are maintained in a perfect operating condition.

SECURITY CAUTIONS

Before any maintenance the genset must be stopped and disconnected from its energy sources otherwise specified .

Norms preview a ground connection for the generator. So it's necessary that the ground installation is efficient and according with the regulations in the country where the generator is installed.

It is the final installer liability the installation of the protections against over current, short circuit, direct or indirect contacts, emergencies, etc, necessary to achieve the compatibility of the machine with the regulations in the country where the machine is installed.

To move the generator use always the lifting elements available in the machine, using hooks or cranes etc, of adequate size, avoiding to lift the generator very high.

Al the maintenance stuff must use always gloves and security shoes. If the generator is lifted over the ground all the personnel has to use helmet.

The generator has to be installed in a room for this purpose, and the access has to be restricted to authorized personnel only.

The floor or concrete base for the generator has to be designed to withstand its weight.

The generator won't work with any protection element, tap, box or cover, etc., dismounted or opened.

The personnel that operates the machine won't wear flying clothes that can get entangled with any moving part of the machine.

In no soundproof generators the personnel with access to the machine should have adequate protection headphones.

Don't touch the generator running because it has hot parts that can cause burns, even time after the machine is stopped, like the turbocharger, exhaust mainfold, water and oil circuits and the alternator, etc. To proceed to maintenance let the machine get cold until it reaches ambient temperature.

Use gloves and protection glasses during oprations with acid of batteries, antifreeze liquid of fuel.

Don't touch the generator standing over wet surfaces, use if necessary isolating platforms.

The maintenace works have to be done always by qualified personnel specially trained for it.

Don't leave cloths, tools or other objects over the generator.

In case of reparation of the electronic speed regulation take precautions to shut off the intake air or gas-oil feed in case of over speed.

TRANSPORT, DELIVERY AND STORAGE

To move the generator use always the lifting elements available in the machine, using hooks or cranes etc, of adequate size, avoiding to lift the generator very high.

In case of storage the generator should be in a dry and cool place, never bleakness or in a wet place.

In case of long storage of if the alternator has signs of humidity check its isolation.

Disconnect the electronic devices of the machine. The isolation test must be done by qualified personnel. In case of low isolation dry the alternator in a oven at 50-60 degrees. Refer as well to the engine instructions to condition it.

At genset delivery take off the packing and check the state of the machine and communicate immediately any possible damage to the transport company and the manufacturer.

Check also if the machine is OK with the order and if it isn't, communicate it immediately.

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INSTALLATION

CONNECTION

The generators, otherwise specified, are connected in factory in a 400/230 star. In the generators that include the electric board inside the machine itself, conect to the outlet plugs, or hubs in case of it, in the hubs of the outlet power switch.

For any change in the connection of the generator please refer to its handbook as well as our assistance service to make consequent modifications in control board.

INSTALLATION TIPS

A genset is a thermal machine so you have to bear in mind the refrigeration conditions. The room for the genset must be conditioned specially for it.

In water or oil cooled machines you have to channel the air flow to the outside via a channel of the right dimensions according the size of the radiator or outlet mainfold of the chassis. Don't restrict the explusion of air with excessive longitude or barriers, anyway exceed the maximum back pressure specified by the engine manufacturer. Take special care in the gensets that are already capsulated and soundproof.

In air cooled gensets you should install air extraction of adequate capacity according to the generator power.

In all gases the combustion gases has to be conducted to the outside through tubes. The union of these and the generator must be made by means of some kind of flexible joint. In any case you must not exceed the maximum back pressure specified by engine manufacturer.

The engine block gases have to be conducted as well by means of any hose.

Our machines are equipped with their own tank but it can be used an external tank, in this case don't exceed the maximum manometric height allowable for the fuel feed pump. It can be recommendable to install in these cases an additional pre-filter and check that the water is no accumulated in the tank now that water can damage seriously injection system. In case of long distances between the daily tank and the machine contact our assistance service.

OPERATION

Before starting the machine read carefully the handbook of the engine and the alternator or any other device fitted in the machine.

COMISSIONING

First of all check oil and coolant level and add if necessary.

Add fuel to the machine.

Add acid to the batteries in the case the are dry and let them rest for at least one hour before cranking. After this time connect the battery hubs. In automatic machines check that the machine is in manual operation because it could start when connecting the batteries.

Close the positive fuse in the boards with digital instruments.

Once the machine is completely installed and connected you can proceed to start it.

MACHINES WITH MANUAL ANALOGIC ELECTRIC BOARD

Check that the load switch is off turn the key to contact position and the indicators light.

Then turn to stat position and release when the engine has just started. If you keep the key in the contact position more than 15 seconds and the machine is equipped with engine protection central, you won't be able to start because the low oil pressure protection has triggered, so you will have to turn the key back to zero to be able to start.

If the machine is air cooled and capsulated check that the fan switch is on any other way you won't be able to start.

If the machine doesn't starts or it takes a lot of difficulty to do it maybe it can have air in the fuel circuit, so you will have to bleed it, unscrewing the bolts that for that purpose there are in the fuel system.

The engines use to have some fuel pump that can be operated manually to help the circuit to fill in.

Once started check the voltage en frequency and other indicators of the machine. The standard conditions of operation are 400 volts and 50 hertz. In case of alternator connected to other voltages or frequencies check that those correspond.

Once the engine has warmed up you can close the load switch and feed the installation.

To stop the machine first disconnect the load and after some minutes for cooling off just press the stop button or turn the key to zero. Leave the key always in the zero position to avoid discharge of the batteries.

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OPERATION ADVICES

The generators of our mark are meant to work in hard conditions but following some directives we'll achieve a longer work life.

First of all don't overcome continuos power of the machine. You can overload a 10% during no long periods of time. Obviously the engine life will depend on the load level we demand from it. Take attention to work conditions as well, especially temperature, due that powers are given usually at 25 degrees and at sea level, so when the conditions vary the acceptable power varies.

In direct start of electric motors, the generator is capable of an overload of 300% during 10 seconds. For example in case of start of electric pumps we recommend 1.5 KVA of generator each 1 HP of pump, although this relation can vary according with the pump. In other starts more difficult, as mills, crushers that start on load or have big inertia you have to over dimension the generator. In case of doubt contact our assistance service.

It's important when possible let the engine to warm up before giving power to the load, this will help to increase engine life expectancy. It's also important let the generator running after disconnecting the load for cooling down and avoid thermal stresses due to the thermal inertia of the engine, with this we'll increase its life as well.

It isn't good to work at low load levels, this will become into a high oil consumption, that is going to accumulate in the exhaust main folds, due that the engine doesn't achieve its normal working temperature. A good working level it could be between the 60% - 80 % of the nominal charge, there is load enough for the engine but we yet have a 20 % spare power to adsorb load variations.

Don't connect reactive power compensation devices, because there's no reason to do it, and it isn't good for the alternator. The alternator works properly with a 0.8 φ cosine.

Don't connect too unbalanced loads, The alternators are designed to work with a similar consumption in the three phases, so if you have single phase loads you have to cast them between phases.

In case of static starters, UPS or any other electronic power device, etc., bear in mind that there is going to be a distortion in the wave of the generator much important than if it were the mains, that can affect to the electronic devices connected to the line, including the ones in the generator.

The current measurement can be influenced if the distortion is important. In this cases it's important to use alternator with electronic regulation and filter, like most of the ones we use, and it could be a need to over-dimension the size of the alternator to reduce the distortion. In case of doubt please contact our assistance service.

Always follow the operation and maintenance instructions of the engine and alternator handbooks.

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MAINTENANCE

In the instructions of the generator and engine you can find the maintenance schedules of both. The maintenance of the alternator is almost nothing, because it consists basically in cleaning and the replacement of the bearing after 20000 hours. But the work of the engine is much more important.

The oil and coolant level have to be controlled every day and add if necessary. The first oil change is usually at the first 50 hour, and from then to each 250 hours. It is advisable to change the oil filter as well as to check the belts tension.

The fuel filter is usually changed each 500 hours and the air filter each 1000 hour depending of the ambient dust and its state proceed to change it or clean it.

The valves clearance and the calibration of injectors is made usually each 2000 hours.

All this period are given as general advise, for further details refer to the engine and alternator handbooks.

It's also very important the cleaning of the machine specially the radiator, due that it can get full of dirt and generate an over heating of the engine.

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SETTING THE GENERATOR SET 1500 rpm

ROOM

- The group must be installed in a sufficiently ventilated space.

1. Cold air flow through the lower part (inlet and outlet in the same orientation) and hot air outlet through the upper part.
2. The distance between the group and the wall must be a minimum of 300 mm. in the case of an open group.
3. In the case of a soundproof unit, the distance between the unit and the wall must be a minimum of 600 mm.
4. In the case of a Standard group with radiator cooling, the radiator must be directed towards one of the walls and, through a pipe, the exhaust air must be directed outside.
5. It is important that the group is well leveled, if there is a degree of inclination greater than 8%, the motor it may have serious lubrication problems.

- In all generating sets with a metal base direct to the ground, it is advisable to insert a solid rubber element between the metal part and the cement, which will vary according to the weight and type of engine. This will attenuate vibrations both to the chassis and the rest of the cabin.

OPERATION OF THE GROUP

- It is not advisable to normally work below 20% of the rated power, it can produce abnormal oil consumption.
- The optimum performance of the generator is always between 40% and 75% of the load.

EXHAUST SMOKE OUT

- In case of installation in a closed cabin and standard group the smoke outlet there are two ways to place the silencer:

1. Silencer directly screwed to the engine block, in this case a hose of no more than 1500 mm must be placed to lead the smoke outlet to the outside, or to another tube with a larger diameter.
2. Silencer hung from the ceiling, in this case the flexible is placed between the motor manifold and the silencer,

then another flexible tube is placed from the silencer to the outside, or to another tube with a larger diameter.

- In the case of installation in a closed cabin and soundproof unit, the flexible tube (max. 1500) must be placed from the exhaust outlet to the outside, or to another tube with a larger diameter.
- The tube outlet through the side wall must protrude at least 200 mm.

COOLING AIR EXPULSION OPTIONS IN SOUND-PROOFED GROUP.

- Depending on the passenger compartment, the expulsion can be made superior (normal) or frontal.

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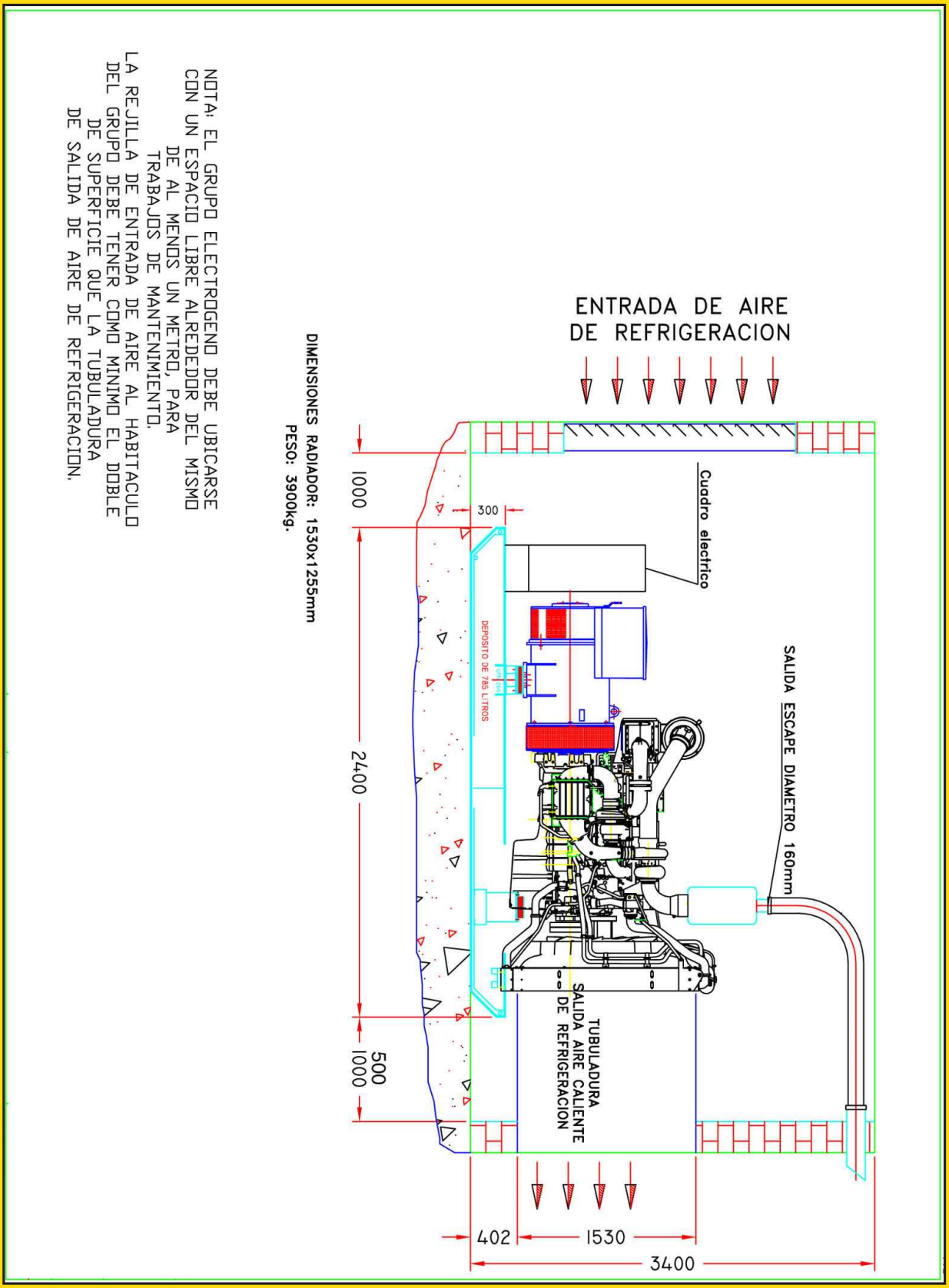
SETTING THE GENERATOR SET 1500 RPM STANDARD



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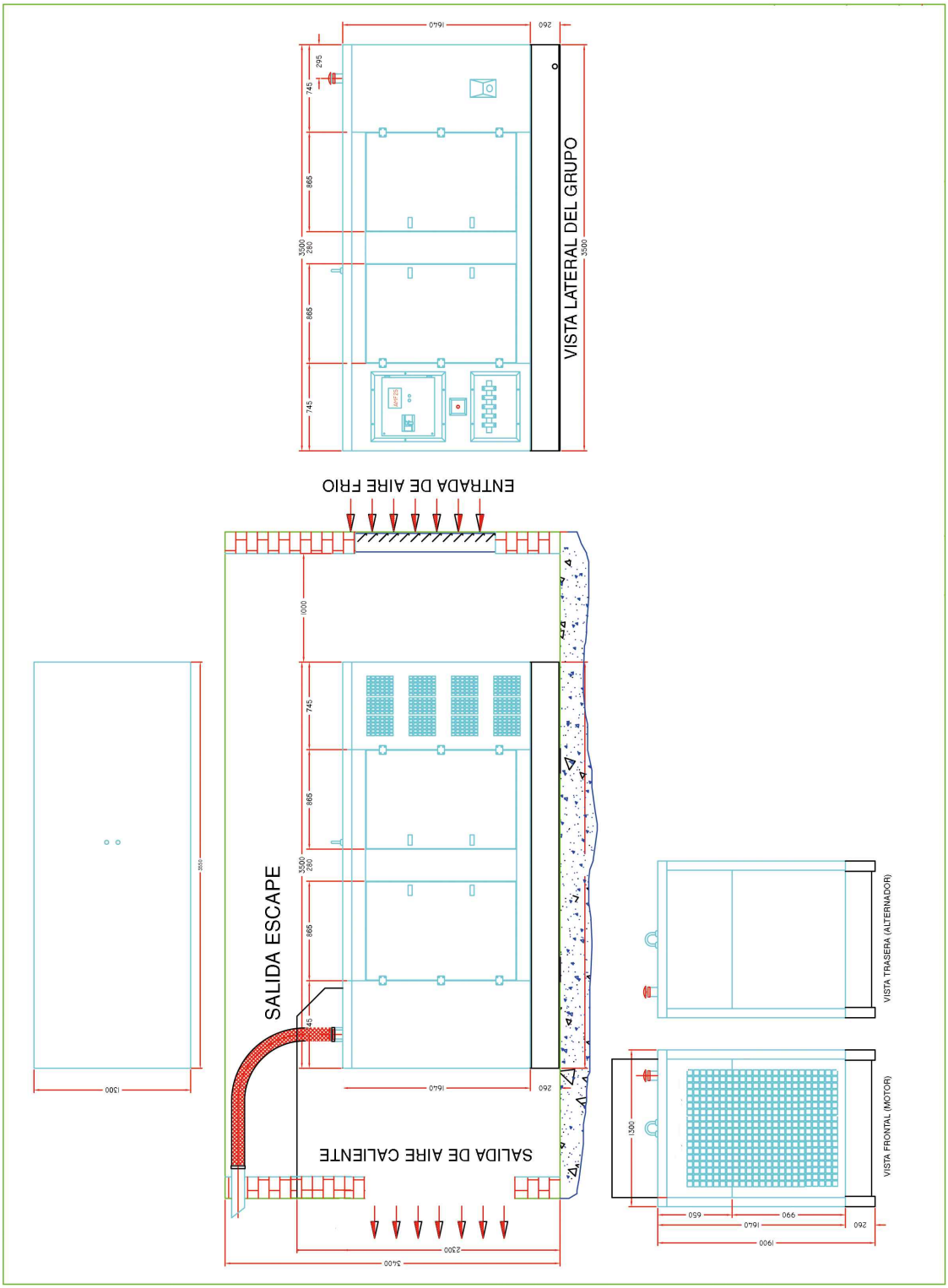
INSTALLATION OF THE GENERATOR SET 1500 RPM SOUND PROOFING FRONT OUTLET



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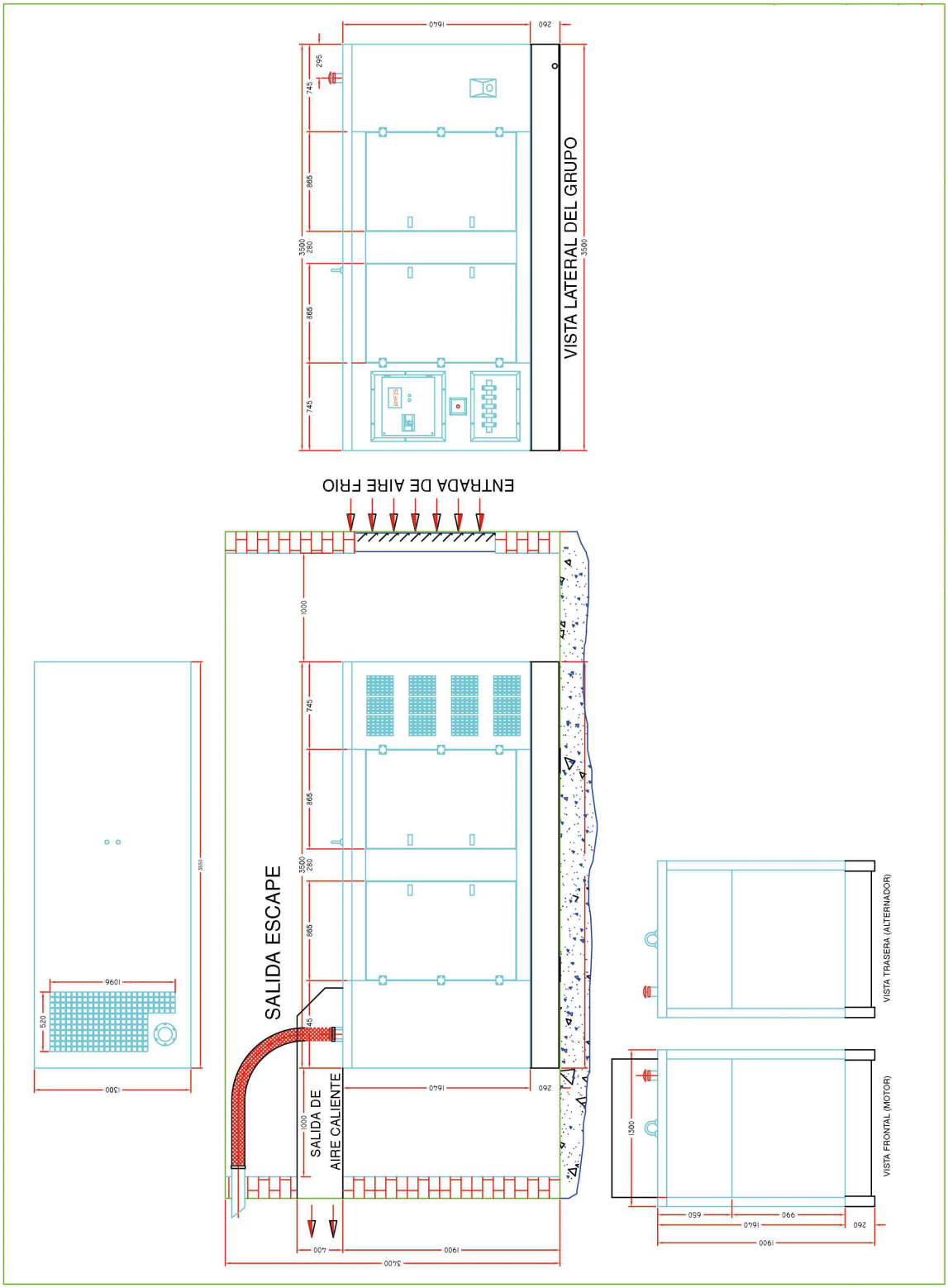
INSTALLATION OF THE GENERATOR SET 1500 RPM SOUND-PROOFING UPPER OUTLET



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MAINTENANCE SCHEDULE

MAINTENANCE	Before each use	Every 250 hours	Every 1.000 hours	Every 2.500 hours	Every 5.000 hours	Every 10.000 hours
Oil Level	X					
Water Level	X					
Oil Filter		X				
Sec. Oil Filter		X				
Fuel Filter			X			
Sec. Fuel Filter			X			
Injectors				**X**		
Casing Gasket			X			
Fan Belts			X			
Alt. Belts			X			
Distr. Belt			X			
Water Filter			X			
Cylinder Head Joint Set				X		
Engine Joint Set					X	
Cylinder Head Joint						X
Piston/Rings				X		
Bearings				X		
Camshaft Bearings				X		
OIL-Seal Crankshaft						X
Cylinder Sleeves				X		
Silent Blocks "V"				X		
Intake Valve			X			
Exhaust Valve			X			
Intake Val. Guides			X			
Exhaust Val. Guides			X			
Intake Valve Seats			X			
Exhaust Valve Seats			X			
Intake V. Spring			X			
Exhaust V. Spring			X			
Turbo Charger Kit			X			
Turbo Charger			X			
Oil Pump				X		
Water Pump				X		
Sec. Water Pump				X		
Thermostat				X		
Crank Engine					X	
AVR					X	
Alt. Battery Charger					X	
Inyeccion Pump				X		
Electro Valve				X		

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MAINTENANCE	Every 250 hours	Every 1.000 hours	Every 2.500 hours	Every 5.000 hours	Every 10.000 hours
Fuel return tubes			X		
Injection tubes			X		
Flexible joint			X		
Oil cooler			X		
Fan					X
Stop solenoid	X				
Low oil pres.switch	X				
High temp.water switch	X				
Low water level switch	X				
Air filter	X				
Regulator bars	X				
Regulator taps	X				
Regulator shaft	X				
Radiator tap	X				
Electric board					X
Conmutator					X
Intensity transformer					X
Control box					X
Low oil press. switch	X				
High water temp.switch	X				
Temperature transd.	X				
Transd. pression	X				
Start switch					X
Board supports				X	
Alternator	X				
Supressor	X				
Diode(-)	X				
Diode(+)	X				
Diode bridge	X				
AVR	X				
Rubber supports		X			
Battery liquid	X				

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MOST FREQUENT PROBLEMS

PROBLEM	PROBABLE CAUSE	SOLUTION
Engine will not turn	Check batteries for charge level. Starter damage.	Change or charge batteries. Check or change.
Engine doesn´t starts	Batteries damaged or discharged. Engine without fuel or low level fuel. Air in the fuel system. Fuel filter closed. Electrovalve damaged. Alert protection is actived. Fuel inyection trouble.	Change or charge batteries. Refill with fuel. Take out the air. Check and change. Check and change. Verified alerts. Check or consult.
The generator doesn´t produce electricity	Electrical protection opened. Fuse of A.V.R. alternator damage. Alternator without remainer. Trouble in the alternator.	Close. Check and change. Charge the capacitor. Consult.
High or low voltage without charge	A.V.R. disadjusted. Engine with low r.p.m.	Adjust the tension A.V.R. Adjust r.p.m.
Voltage lower than nominal voltage	Overload. Engine with low r.p.m.	Check and reduce the charge. Adjust the r.p.m..
The generator stops	Stopped as a safety measure. Air intake.	Check the alarms and resolve the problem. Check and eliminate.
Generator starts and stops.	The magnetic switches or circuit breakers are disarmed.	Rearmed the magnetic switches or circuit breakers.

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DECLARACION DE CONFORMIDAD / DECLARATION OF COMFORMITY / DECLARATION DE COMFORMITE

Manufacturer: AYERBE INDUSTRIAL DE MOTORES, S.A.
C/ Oilamendi, 8 - 10
01015 Vitoria - SPAIN
CIF: A01109206

CE

Hereby declares that the generator **MODEL**: with **PLATE:**

complies with all applicable provisions of the Machinery Directive (Directive 2006/42/EC) and national regulations which transpose it;
it also meets all applicable provisions of the following EC Directives:

EMC Directive 2014/30/EC
Directive 2005/88/EC of noise emissions (as amended)
Directive 2014/35/EC of low voltage
and all national regulations which transpose it;

it meets the provisions of the following harmonized standards: EN ISO 14121-1:2007 and EN12601:2001

By virtue of that which is stipulated in Directive 2005/88/EC (2000/14/EC):

- The following values indicate the acoustic levels for the aforementioned machine:

Measured acoustic level: _____ dB
Guaranteed acoustic level: _____dB

- We have followed a process of total quality assurance in order to evaluate the conformity which is approved by the following notified body which intervened:

TÜV RHEINLAND LGA PRODUCTS GmbH. Nº 0197

Certificate of Compliance Nº: HO 60159877 0001

The contact information of the person to draw up/store the technical report are:

D. Adrián Martínez de Albornoz Arregui
Manager
AYERBE INDUSTRIAL DE MOTORES, S.A.
C/ Oilamendi, 8-10
01015 VITORIA - SPAIN

Signed
Adrián Mtz. Albornoz
Manager
In Vitoria, on January 1, 2022

PERFORMED MAINTENANCE

D A T E	DESCRIPTION	REPLACED ELEMENTS	AUTHORIZED PERSON

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