

FEIDER

MACHINES



**WATER-COOLED
DIESEL GENERATOR SET
FGED21000/ FGED31000
INSTRUCTION MANUAL**

CAUTION: Read the instructions before using this machine.

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1.SUMMARIZE

- Water-cooled diesel generator mainly using QC480D、QC498D、4102D and 4105D Series diesel engine is four stroke,water-cooled, in-line, direct injection, with turbocharger diesel generator, fitted Mindong Yanan, Kaijieli, Marathon, Stamford alternators, or matched according to the customers requirements, good reliability, long life, has a good supporting adaptability to meet customer's different requirements. For mining, construction sites, communications, small cities and towns as a flow or fixed power supply, supply power, lighting, communications, or other emergency backup power.
- This operation manual is make a brief description of QC480D、 QC498D、 4102D and 4105D series diesel generator's working conditions, unit structure, performance indicators and installation and maintenance.

2.WORKING CONDITIONS

- 1) Generator in the following standard conditions should be able to output rated power, rated power has common power and standby power two kinds. Common power means this generator is able to work continuously as a power unit 12h, these include 10% of the work overload 1h; standby power means this generator is able to work continuously as a power unit 1h, no over-load capacity.
 - a. Atmospheric pressure 100kPa.
 - b. Environment temperature is 298K (25℃) .
 - c. Relative air humidity is 30%.
 - d. If over foregoing conditions continuous running, (under the conditions of in accordance with the provisions of the maintenance manual) the output power is according to the diesel generator's rated power of the revised 90% of the electric power conversion, but this electric power maximum shall not exceed the generator's rated power, when using conditions not conform to this provision, the output power is according to the provision GB/T 6072.1-2000's method to revise diesel generator's power of the electric power conversion, but this electric power maximum shall not exceed the generator's rated power.
- 2) Generator under the following conditions could output rated power (to allow power to amend) and stable working.
 - a. Sea level height can't exceed 4000m.
 - b. Environment temperature is (5~40) ℃.
 - c. Relative air humidity is 90%(25℃).
 - d. When test sea level height exceed 1000m (but not exceed 4000m), Environment temperature's upper limit value is according to sea level height reduce 0.5℃ revise for each additional 100m.
- 3) Diesel generator only suitable for indoors or have the occasion to avoid the sun and rain (Except for the performance of a water-resistand box-type unit), diesel generator not suitable for using in the air with a conductive dust,corrosive gases occasions.

3.MAIN TECHNICAL SPECIFICATIONS AND TECHNICAL PERFORMANCE

3.1 GENERATOR TECHNICAL SPECIFICATIONS

Model	FGED21000
Type	Single-phase/three-phase
Voltage Adjusting System	Automatic Voltage Regulation(AVR)
Voltage/Frequency	230V/400V~ 50Hz
Rated power	COP20 kW
Max power	21 kW max
Rated Current	86,95A/28,99A
Power Factor (cos Ø)	1.0/0.8
Engine model	Quanchai QC498D water cooled 4 cylinder diesel engine
Displacement	3168cc
Rated output	22kW @1500tr/min
Fuel	Diesel light oil
Fuel tank capacity (L)	50L
Engine oil capacity (L)	6,5
Starting System	Electric
Protective system of low oil pressure	YES
Solar connect terminal	NO
ATS connector.	YES
Degree of protection	IP23M
Class quality	B
Performance class	G1
Dimension L*W*H	201x96 x123cm
Net Weight	860kg
Sound power level guarantee : L _{WA}	97dB(A)
Sound power level measured: L _{WA}	93.67dB(A)
Noise level @7m	60 dB(A)
Uncertainty of noise test	K=1.5dB(A)

Model	FGED31000
Type	Single-phase/three-phase
Voltage Adjusting System	Automatic Voltage Regulation(AVR)
Voltage/Frequency	230V/400V~ 50Hz
Rated power	COP20 kW
Max power	31 kW max
Rated Current	130,43A/25,0A
Power Factor (cos Ø)	1.0/0.8
Engine model	Quanchai QC4105D water cooled 4 cylinder diesel engine
Displacement	4087cc
Rated output	38kW@1500tr/min
Fuel	Diesel light oil
Fuel tank capacity (L)	60L
Engine oil capacity (L)	8.0
Starting System	Electric
Protective system of low oil pressure	YES
Solar connect terminal	NO
ATS connector.	YES
Degree of protection	IP23M
Class quality	B
Performance class	G1
Dimension L*W*H	201x96 x123cm
Net Weight	1030kg
Sound power level guarantee : L _{WA}	97dB(A)
Sound power level measured: L _{WA}	93.67dB(A)
Noise level @7m	65 dB(A)
Uncertainty of noise test	K=1.5dB(A)

3.2 GENERATOR MAIN TECHNICAL PERFORMANCE

- 1) Generator voltage and frequency' s adjustment rate, stabilization time and volatility not exceed below table provision

Diesel Generator Governor Type	Voltage			
	Steady Regulation %	Transient regulation %	Recovery Time (S)	Stabilization time %
Mechanical Governor	≈1	+20 -15	1	0.5
Electronic Governor	≈1	+20 -15	1	0.5

Diesel Generator Governor Type	Frequency			
	Steady Regulation%	Transient regulation%	Stable Time (S)	Stabilization time %
Mechanical Governor	5	≈15	7	1
Electronic Governor	0~5 (to adjust)	≈15	7	0.5

Notice:

- a. Generator under 0-25% rated overload, the voltage and frequency' s stabilization time than the values listed to allow large 0.5.
 - b. When calculate steady regulation, not including cold to hot state voltage change.
- 2) Generator' s unload voltage tuning range is 95~105% rated voltage.
 - 3) When generator unload rated voltage, sinusoidal line voltage waveform distortion rate of not more than 5%
 - 4) When generator unload rated voltage, plus a three-phase symmetrical load(COSØ=0.8 lag), then in which either phase plus 25% of the rated power resistive load, but total load current should not exceed rated value, at this point the maximum line voltage of generator (or minimum) and three phase line voltage difference between the average should not be exceed three phase line voltage the average of 5%.
 - 5) Generator can directly start the following table under the unload four-pole three phase squirrel-cage induction motor.

Generator Rated Power (KW)	Asynchronous Motor Rated
----------------------------	--------------------------

	Power (KW)
40 50 64 75	30
90 100 120	55
160 180 200	75

- 6) Generator can be working under 110% of rated power, the overload continuous operation 1h.
- 7) Generator with automatic protection function:
 - a. During operation generator can automatically monitor the generator speed, water temperature, oil pressure and other parameters, when parameters limited it can be issued light alarm signal, indicating that the parameters of the more limited the control system reset, alarm disappears, when the parameters of the more limited to the extreme, except issuing warning light, and can also automatically shut down, alarm and shutdown values, as follows:
 - b. When water temperature $\geq 97^{\circ}\text{C} \pm 2^{\circ}\text{C}$ the alarm shutdown, when oil pressure $\leq 0.08\text{MPa} \pm 0.02\text{Mpa}$ the alarm shutdown; when speed $\geq 120\%$ of rated speed the alarm down.
- 8) When generator in normal operation, normal model is normal noise, if customer need low noise model, it's generally according to the customer provided requirements to produce, if no special requirements, standard is 75dB(A) at seven meters.

4. WARNING AND SAFTY

4.1 WARNING

- 1) When install and move the generator set, you should handle with care, no collision or reversal.
- 2) Generator operator should be compliance with safety operation, including manual and warning device mark, otherwise, it may cause damage to generator set and person.
- 3) During operation, be sure to wear protective glasses and shoes, put on working clothes, do not wear loose or torn clothes.
- 4) When the generator is running, must closely observe the status of set, regularly check for leaks, oil spills, gas leakage, and where the connection position has abnormal sound and so on. If you detect abnormality, stop and do with it immediately.
- 5) Incorrect installation, operation, maintenance or replacement parts will lead to serious casualties or damage to set, maintenance personnel must possess the service eligibility.

4.2 SAFETY

- 1) To ensure that the installation of set to meet all the applicable safety standards and local electrical standards. All of the installation should be by a qualified electrical or mechanical personnel to implement.
- 2) Set supported by the jack or at the time on a hook, do not allow any repair operation, be sure to use block paving or do the maintenance operations after stent with special support.
- 3) Before any repairs or maintenance work, first remove the battery wiring, avoid starting suddenly, display "prohibited operation" signs in the operating room or control area; second, to cut off the power grid or other generators of the closed-loop between the two groups. Place a warning sign prohibiting on the circuit breaker switch. So as to avoid accidental closing event.

- 4) For the following hazards related to the personal safety of diesel engine spare parts, our company do not allow to repair, if there are signs of damage, should be updated: balance weight block, balance shaft components, cooling fan components, fan wheel components, install the fan mounts, fan fixed bolts, lifting plate, turbocharger compressor scroll, scroll turbocharger turbine, turbocharger into the pipeline, shock absorber fastening bolts, and even bar bolts, fuel solenoid valve components, fuel high and low pressure tubing.
- 5) You can not move the fan site rotating diesel, this abnormal operation may cause serious personal injury or damage to fan blades.
- 6) You can not operate the generator set when in a protective cover, maintenance of cover, or the outlet lid is opened.
- 7) If the generator is in working condition or cooling fluid is a thermal time, you should wait after the shutdown temperature is below 50°C, then open the radiator cap, to avoid scalding by steam and water sprayed.
- 8) When the unit is running, you shouldn't touch or near the fan, belts and other rotating parts. So as to avoid the involvement of hands or clothes etc.
- 9) Before the demolition or release of any pipeline, fixed joints or related components, first release the air, lubricating oil or cooling system pressure. You can not use hands to check the leakage, to prevent harm to human body by high-pressure fuel or lubricating oil.

4.3 SECURITY WARNING DIAGRAM

1) Security warning labels



“ ”: Attention to prevent the involvement of the hands and clothes, attached to the fan, belts and other rotating parts nearby.



“ ”: Attention to prevent high-temperature burns, attached to the exhaust pipe, turbocharger, intercooler intake manifold, expansion tank parts and other high-temperature protec



“ ” : Be aware of electric shock, attached to the cover of all maintenance board and outlet boxes.



“ ” : Note the safty, attached to the cover of the permanent magnet generator and generator cover nearby.

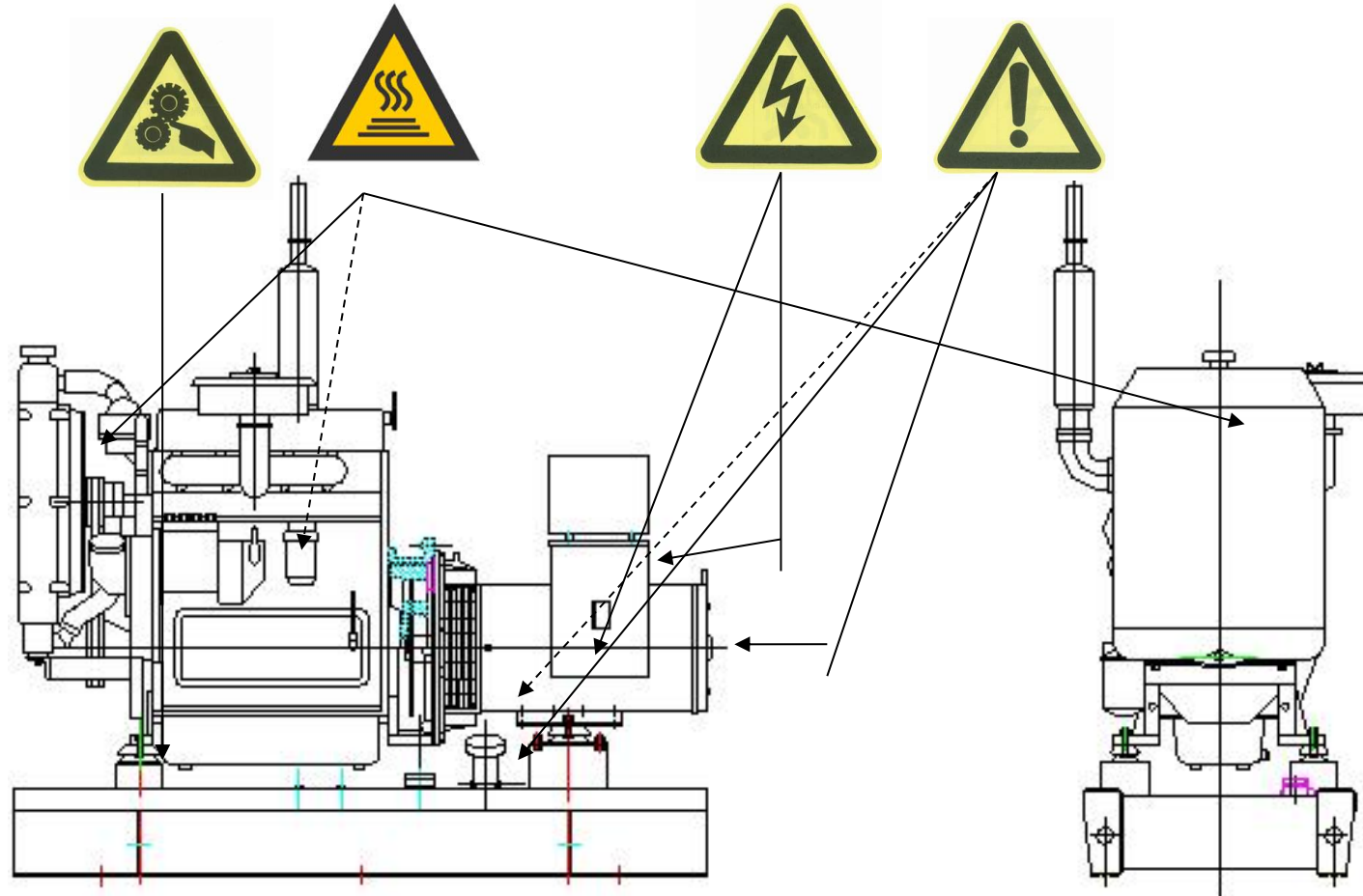
2) Warning distribution diagram, dotted lines indicate paste the location in the opposite.

Attention to preventing the involvement of hands or clothes

Attention to preventing high-temperature burns

Beware of electric shock

Caution



5.GENERATOR STRUCTURE

Generator set is composed of diesel engine(including water tanks), alternator, control panel and the public base or the base fuel tank and so on. All the components of unit are installed on the machine cradle, it is convenient for the movement and installation.

5.1 DIESEL ENGINE

- Water-cooled diesel generator mainly using QC480D、QC498D、4102D and 4105D Series multiple cylinder diesel engine, with the advantage of robust, reliable and durable, a small force, fuel-efficient, sound light and easy operation, easy maintenance, repair and so on, diesel engine cooling system use closed-cycle cooling water, fan for foreign-blown. Diesel engine and generator adopts a flexible disc connection, it also can provide for open frame type generator set.
- In the safety precautions, diesel tank is equipped with an overall shield. Ensure that the fan and the pulley and other rotating parts are not directly exposed to the outside, eliminate the security risks, when the set runs, the temperature of diesel engine exhaust pipe and turbocharger side is high, is the non-work side, staff members shall not touch it.

5.2 ALTERNATOR

Alternator using Kaijieli brand and Marathon brand brushless alternator, or matched according to the customers requirements。 Alternator is single-bearing steel structures, brushless excitation, H-class insulation, voltage regulator, high precision, good reliability. Generator using single-bearing structure, through the steel flywheel connected with the diesel-driven.

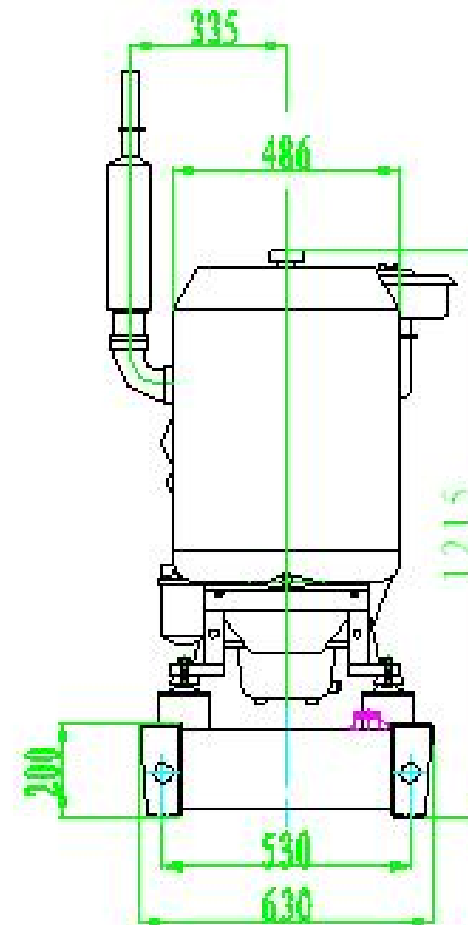
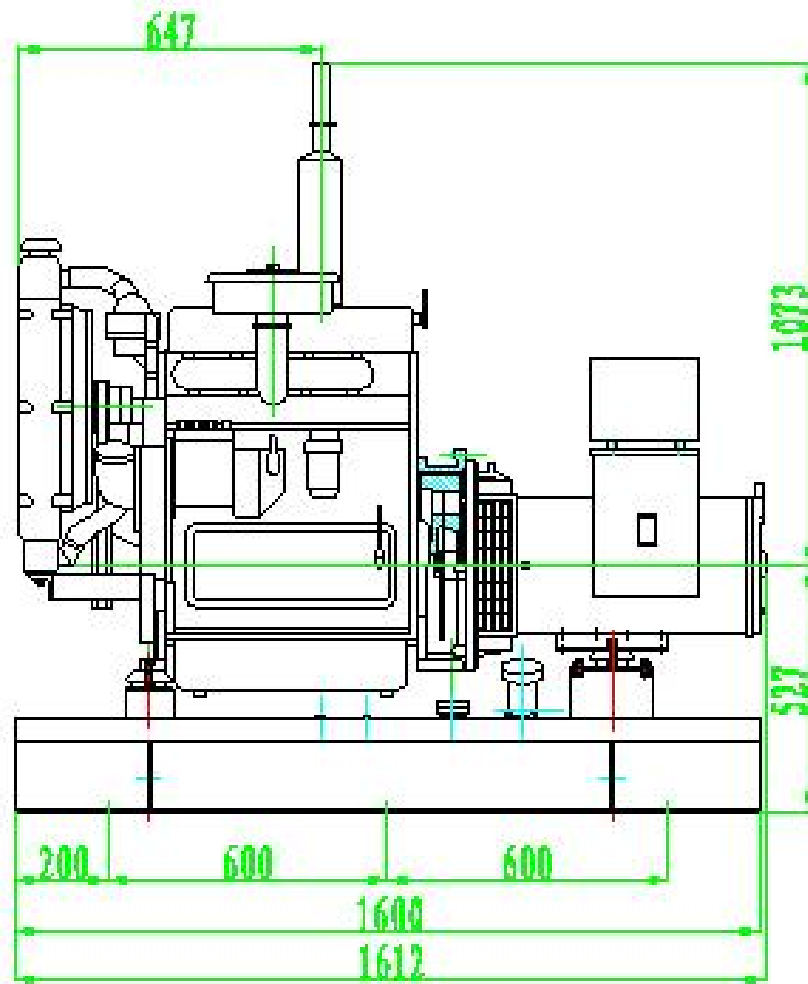
5.3 CONTROL PANEL

Control panel of the generator used to implement start, run, stop, emergency stop and other operations. Provide manually start generator ' s function, can automatically monitoring the generator's operation, providing the engine high water temperature, low oil pressure, charge failure, overspeed protection function. Control screen panel to provide instruction sheet plant operation parameters, user-friendly and intuitive to view the machine status.

5.4 BOTTOM FUEL TANK

The bottom fuel tank connect the fuction of fuel tank and unit bearing, enables a continuous 6-8 hours non- stop oil, there is no security risk.

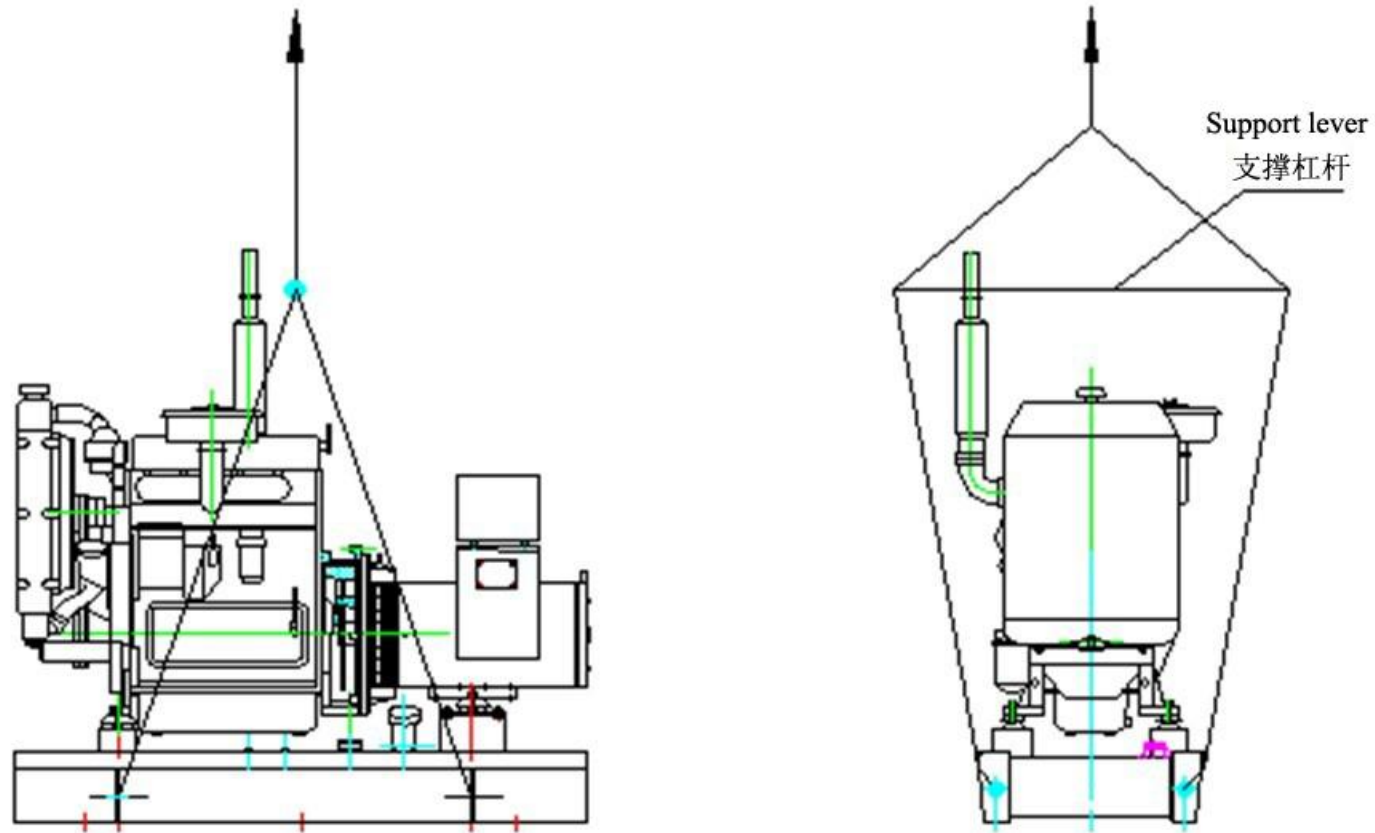
5.5 GENERATOR SURFACE DIMENSION



6.GENERATOR' S INSTALLATION

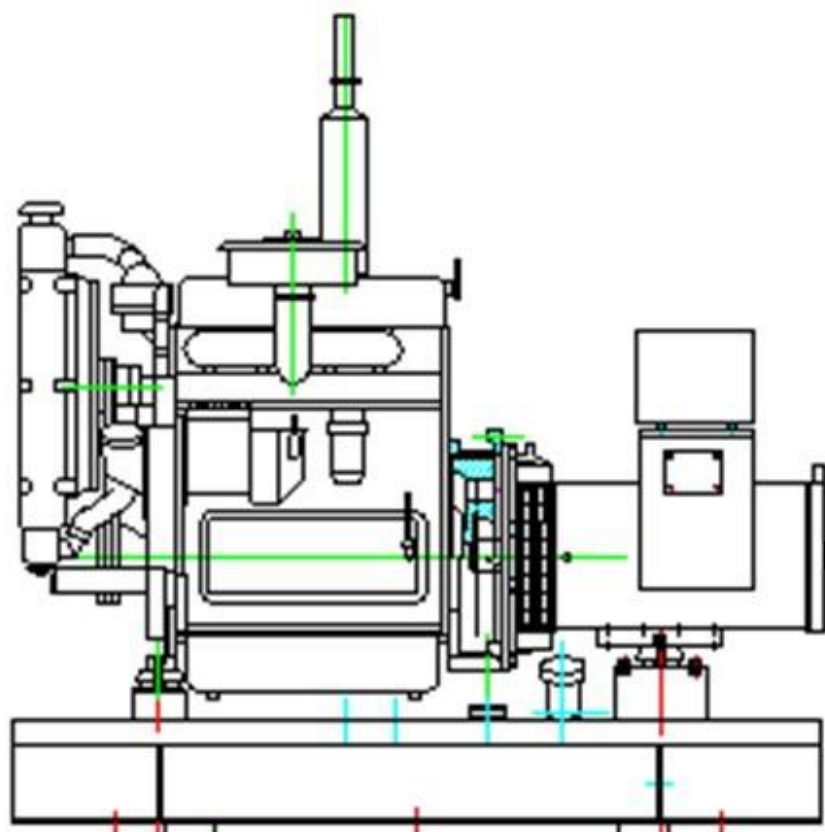
6.1 GENERATOR LIFTING TRANSPORTATION MAP

- Slings lifting

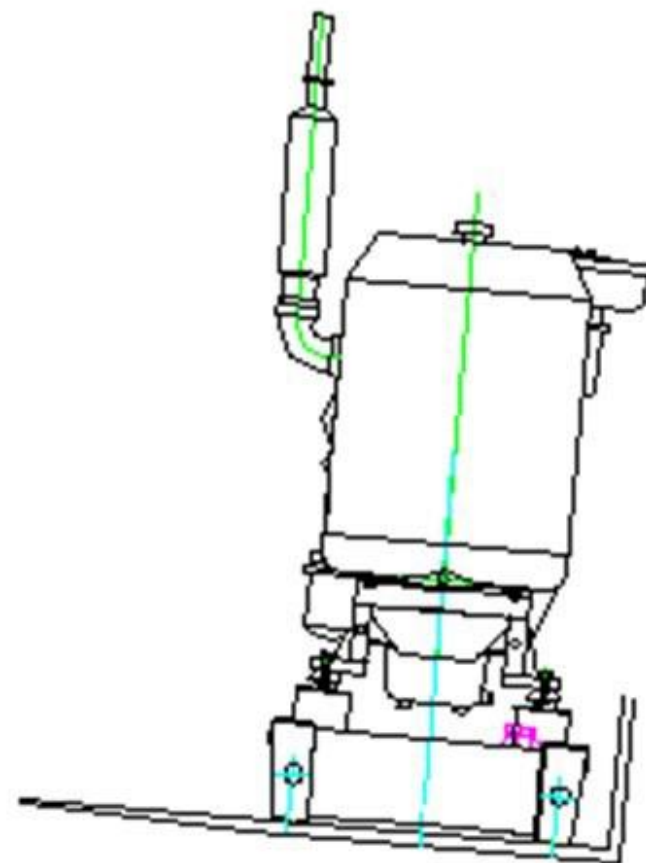


采用尼龙绳专用吊具起吊 Professional nylon rope lifting spreader

- Forklift shipment



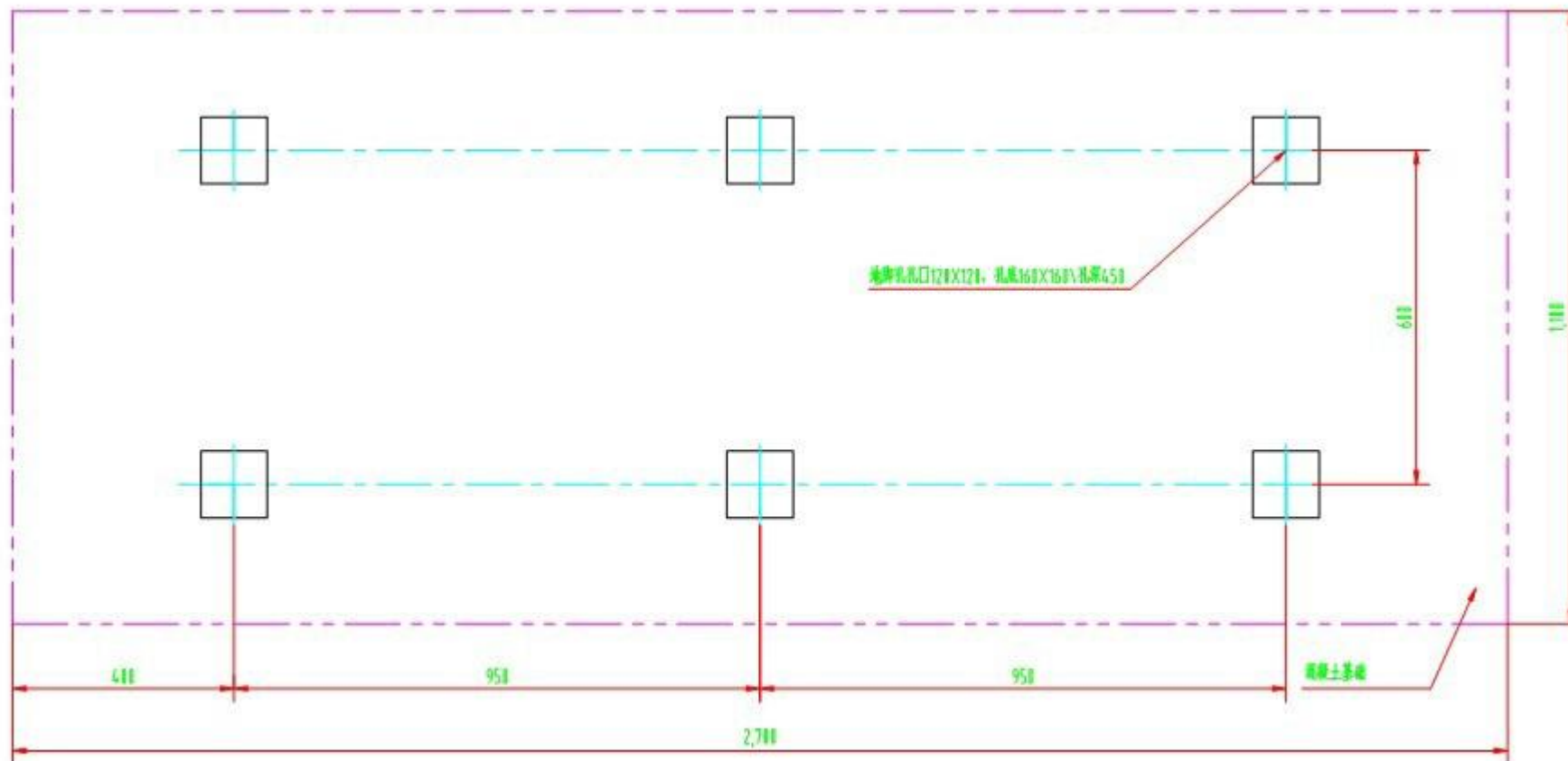
铲车叉距大于 800
Forklift's fork distance is more than 800



采用铲车装运 Use of forklift truck shipment

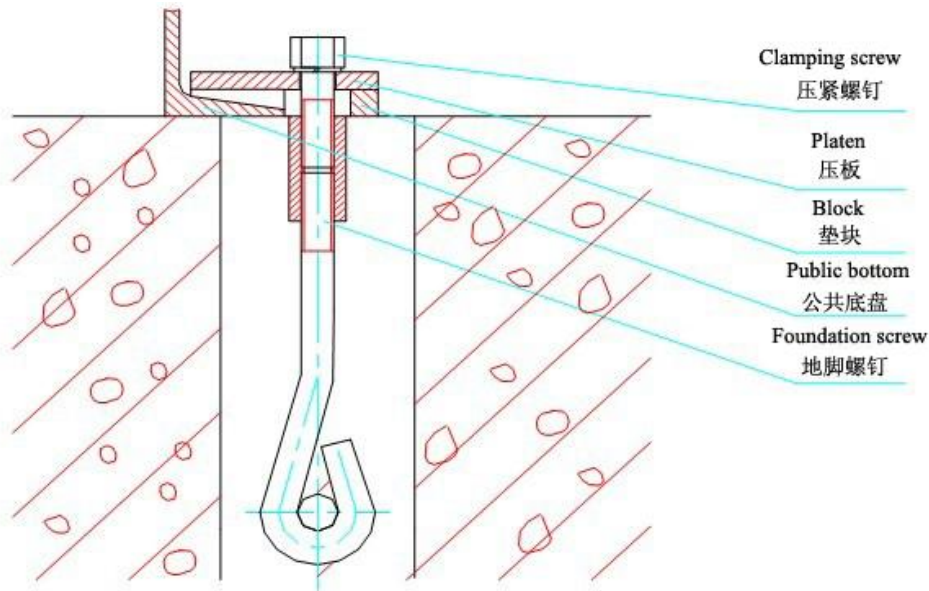
6.2 INSTALLATION DIAGRAM

- Foundation Diagram (Size according to different size unit to implement)



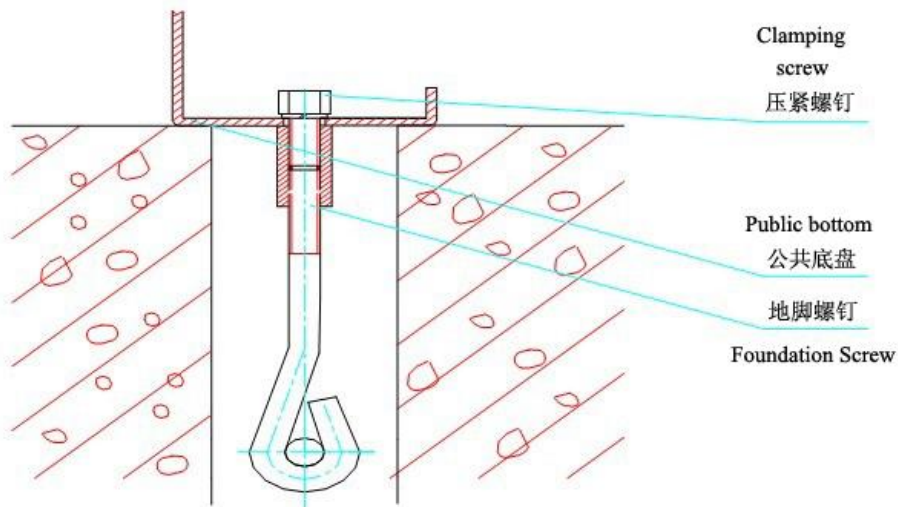
机组基础图 Generator foundation diagram

- Platen fixed diagram



压板固定示意图 Platen fixed diagram

- Generator foundation installation diagram



公共底盘地脚孔固定安装示意图
Public bottom foundation hole installation diagram

6.3 THE ROOM LAYOUT AND REQUIREMENT OF DIESEL GENERATOR SETS

- 1) Room layout principles: Ensure the set (including diesel engine, generator and control panel) can be normal working, and easy for operation and maintenance, users should be in accordance with the actual use of set and the selection of machine model to consider the specific program, users can ask the technical staff to design the room layout, implementation of the construction. When design the room, you should pay attention to the following matters:
 - a. When install the exhaust muffler, you should put the muffler outdoors, exhaust pipe can not be too long, if possible, the surface of the exhaust pipe should be wrapped of insulation materials, in order to reduce the heat to indoors.
- 2) The room should have good ventilation conditions, especially around the air filter must have sufficient fresh air. You don't allowed to place the things inside the room such as corrosive gases that produce acid and so on.
- 3) For the silent type, generally does not require forced ventilation, it can brought air to outside by the air exhaust fan of generator, to induce the air convection inside the room, But be sure to set the in and out air outlet. If the room's ventilation conditions are relatively poor, you should take forced ventilation, air inlet should be low, the fan should be installed on the highest position of the room, to let the maximum airflow go out of indoors in time.
- 4) When installation, in addition to the requirements of the ventilation, room should also be considered lightning, noise, vibration isolation, fire, safety, environmental protection, lighting and sewage and so on. In the northern regions, it should also have heating measures, ensure that the generator set can start normally.
- 5) Fuel pipe and cable had better lay in the slot or trench, cables can also be laid in the wire tube.
- 6) Set should be left around the room for 0.8-1.0m distance, don't put anything, operators to facilitate inspection and maintenance, room size dimensions in the below table, just for your reference.

(KW) Rated output	Room layout size requirement		
	Long	Width	Effective High
40~64	5	4	4
75~120	5.5	5	4.5
160~250	6.5	5	4.5

6.4 DIESEL GENERATOR SET FOUNDATION REQUIREMENTS OF INSTALLATION

- 1) The installed base of diesel generator sets should be able to carry the weight of the generating unit, the general weight of cement-based unit weight of 1.5-2 times, If the room is in joint-part construction and has shockproof requirements, vibration isolation should be the basis, weight of the basis is 3-5 times of the generator weight, vibration-based should be designed by civil engineers, before installation you can do a good basis, set aside fixed foot hole on the basis, unit will be placed on the level of smoothing on the basis, to make uniform contact with the pivot, uneven place can be pad real with thin steel plate or rubber mat. At last, use plate or bolts to fasten it, during its use, it shall be no loosening.

- 2) The base structure of diesel generator set should according to the foundation of the soil structure, generally speaking, the basis of depth(thick) is 0.7-1m. The basis can be higher than plane surface of 150mm or the same as plane surface, the basis of length, width should be larger than the public chassis length and width of 200mm.
- 3) You should lay a solid foundation at the bottom basis, when pouring concrete, should reserve a fixed foot hole based on the fixed bottom location of the hole. size of hole is 120×120mm, bottom of hole is 160×160, depth is 450mm, in order to be used with a fixed bolts.(fixed bolt is M18).
- 4) The set can use the public foot hole at the end of chassis as a fixed installation, you can also use the pressure plate to install, when you use pressure plate to fix, the basis of width of bottom foot hole should be counted widen.

6.5 DIESEL GENERATOR SET REQUIREMENTS OF ANCILLARY FACILITIES

Diesel generator' s oil, water and exhaust pipe connections must be clean, smooth, connected firmly and reliable sealing, electrical connections must be arranged in order, firmly without loosening. There should have sewage tank around the basis.

6.6 INSTALLATION NOTES

- 1) Installation and choice of use location should meet the following conditions:
 - a. Well-ventilated, ambient temperature does not exceed 40°C.
 - b. The environment is clean, avoid placing the things that produce acidic, alkaline and other corrosive gases and steam items nearby.
 - c. It had better be installed indoors or be able to avoid the sun and rain occasions.
- 2) If generator as a stationary generator set, when use concrete foundation, when installtion, you should use horizontal ruler to measure the degree of level, make it fixed on the basis of level; if generator set not fixed on the basis, then should adopt a flexible pad on the chassis, to avoid excessive vibration.
- 3) If operate the set indoors, you should let hot air of fan and diesel exhaust emissions out of doors. Exhaust pipe diameter can not be too small, curve can not be too much, in order to ensure smooth exhaust. And you' d better let the pipe slightly downward-sloping, it helps the tube condensation of moisture easy outflows.

Note: If you installed corrugated exhaust pipe, when installing, bellows can not be used to compensate for any displacement caused by installation errors, especially should be banned due to bellows reversed when install, For in-band diversion pipe bellows, you should do correct installation according to the exhaust flow direction.

- 4) The fuel tank should have the filter, the fuel tank liquid level should not be lower than basis level of diesel engine.
- 5) The connection wire between generator set and low-voltage control screen, should be laid in the cable trench.
- 6) Generator set must be installed grounding wire, ground must be well connected(buried deep underground copper).

7. OPERATING INSTRUCTIONS AND MAINTENANCE

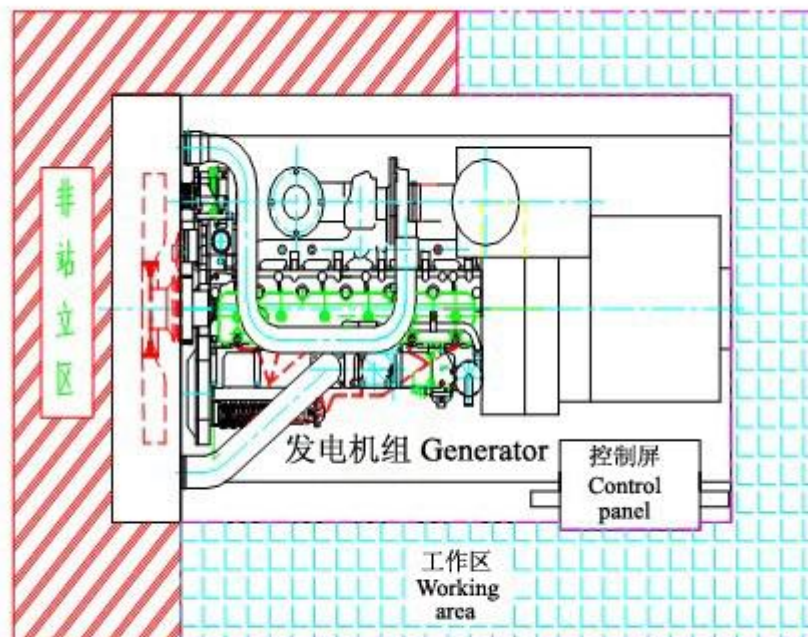
7.1 DISTRIBUTION OF OPERATING BUTTONS

With ATS digital panel, as photo:



7.2 OPERATING INSTRUCTIONS

- 1) Work area map, please don't stand at "non-standing zones" after the operation, to avoid injury.



工作区域图 Working Area Picture

- 2) Preparation of pre-start:
 - a. Remove dust, water tracks, traces of oil, rust and so on attached to the set surface.
 - b. Check all mechanical joints and fasteners whether there is loosening; check all moving parts are flexible rotation, whether there is the phenomena such as friction and dead stuck; check all wire connections, whether the wiring is correctly and firmly, the contacts is good and reliable, any loose or fall off phenomena.

- c. Check the deposit fuel at the bottom fuel tank, whether meet the needs of run-time requirements.
 - d. Use fuel hand pump to exclude the air within the fuel system.
 - e. Check whether there is sufficient fuel in bottom fuel tank.
 - f. Check whether the cooling water tank is filled with cooling water.
- 3) working monitoring units, automatic air switch should be at the open circuit position, “high/low-speed rotary switch placed in the location of idle speed(if has this function).
- 4) Start steps.
- a. Place the control power switch to the power-pass position, this knob mainly used to supply control circuit power, and this can not achieve the generator’ s start control.
 - b. Press the start button. Used to control power to start the motor running, then control the set’ s successfully control. Maintain about 3-5 seconds, then it can operate normally, make the diesel generator start, when you leave your hands, the button will jump back automatically; After 12S, diesel generator can not start, you should wait 2-3min, then start again, if it can not start for three times, you should check and find out the reason, after the problem solved, then you could start again.
- 5) After starting generator, if the idle speed is operating normally, adjust the rotation speed to 1820-1830r/min(if has this function), adjust the voltage to rated position, at this moment, the readings of frequency table should point to 60.5HZ-61HZ(if has this function), you should check whether the direction of voltage meter, frequency meter and oil pressure gauge is correct, whether the hour meter is running, whether the charging fault light is off, whether there are abnormal noise in various parts and so on; after everything is normal, then you could close the automatic air switch.
- 6) Check during operation.
- a. When the set is working normally, voltage should be about 220V, current should not exceed the rated current of generator, the frequency should between 60HZ, you should through the commutation phase switch, check the three-phase voltage and current’ s valves change regularly, diesel engine’ s water temperature, oil temperature and oil pressure should be within the normal range, When the set is running, you should always pay attention to their change, when the valves exceeds, it should shed some load or shut down for checking.
 - b. You should always check the various pipes, if has leakage, you should restore it as soon as possible.
 - c. Observe the color of exhaust air, diesel generator with full load under normal conditions, the color of exhaust air allowed a bit blue gray.
 - d. Can not let water, oil or metal debris into the inside of generator.
 - e. If there is abnormal phenomenon that requires immediate shutdown or stop, press “emergency brake” button to stop it.
 - f. During its operating, must be recorded, often recorded things such as the measurement readings, ambient temperature, operation and downtime, downtime causes and results of inspection or temporary repairs,etc.
- 7) Steps of shut down the generator manually.
- a. Gradually shed load, disconnect the automatic air switch.

- b. Under the situation of no-load, when the water and oil temperature reduced to below 70°C, press the stop switch, make the diesel generator stoped.
- 8) When the environment temperature is below 5°C, you should clean the diesel engine cooling system' s water of cooling water tank, circulating pumps, diesel engine out to prevent freezing, however, for those added antifreeze, you can not pour in the water.
- 9) Clean all the generator, and do the preparations for next-time start.
- 10) Notes.
 - a. The maximum amount of diesel oil, the maximum speed, the air switch setting value, voltage regulator” stability” adjustment potentiometer position, electronic speed adjustment potentiometer, all had been adjusted and tested, users should not adjust arbitrary and by own.
 - b. When start the generator, operator should wear earplug, to prevent the damage to human health.

7.3 Generator's maintenance

Since the diesel generator set is composed of diesel engine, generator and control screen, and each component has its own separate structure and performance and maintenance requirements, the following is only a brief overview, to make the various components have proper and correct maintenance, in order to achieve perfect maintenance, please carefully refer to components of the product description, regularly check and maintenance in accordance with its content required and prevention.

7.3.1 Generator's technical maintenance

Generator' s technical maintenance divided:

- Routine maintenance(everyday work)
- First technical maintenance(accumulated 250 hours of work)
- Second technical maintenance(accumulated 500 hours of work)
- Third technical maintenance(accumulated 1500 hours of work)

1) Routine maintenance, operators should be responsible for it.

Before starting, first do the routine maintenance, check the oil and coolant, check the possible leakage, loose or damaged parts, worn or damaged tape, as well as any changes in diesel engine, its main contents are as follows.

a. Check the level of oil.

Check the height of oil need should after shutting down the set(at least 5 minutes), when the oil level below the oil level gauge on the “L” (low oil surface) mark or above the “H” (high oil surface) mark, absolutely not allowed to start.

b. Check the fuel level in the bottom fuel tank.

c. Check the cooling liquid in water tank.

Open the cap of water tank, check the cooling liquid surface.

d. Check the drive belts.

e. Check the cooling fan.

2) First technical maintenance (accumulated 250 hours of work), operators should be responsible for it, Upon the completion of routine maintenance, then add the following maintenance items.

- a. Replacement of oil and oil filter.
- b. Replacement of coolant filter.
- c. Check the air filter.
- d. Check the air intake system.
- e. Check the air cooler.
- f. Insulation Test.

Insulation test should be conducted in accordance with test devices in the operating manual, the minimum value should be greater than 1.0 megohm, this must be performed by qualified electrical operator.

3) Second technical maintenance (accumulated 500 hours of work), operator should be responsible for it, Upon the completion of first maintenance, then add the following maintenance items.

- a. Replacement of fuel filter.
- b. Fuel system deflated
- c. Check the antifreeze and coolant added concentration(for the generator set that added antifreeze coolant).
- d. Clean generator air filter(for generators with air filter)

During the demolition of air filter parts, you will touch the charged parts, You can do the demolition of parts until shutting down the set.

4) Third technical maintenance(accumulated 1500 hours of work), professional operator should be responsible for it, Upon the completion of second maintenance, then add the following maintenance items.

- a. Adjust the valve clearance
- b. Check the belt tension condition
- c. Check the tension wheel bearings
- d. Check the fan
- e. Check and verify the instrument, in order to ensure the correct direction.

7.3.2 Generator' s Troubleshooting

There are many reasons for failure, and different failure shows different phenomena, therefore, the failure exclude need the person of training qualified and must have a corresponding electrical and mechanical qualification to operate it, they should on the basis of understanding the principles of set structure, operation and commissioning, then have a better understanding of under what condition, the set can work normally, under what circumstances, failure is easy to appear, when the failure appear, how to analyze the faults causes according to the failure behavior. Through in-depth and detailed analysis, in order to set forth the correct solution, eliminate failure.

The following troubleshooting methods provide a general trouble-shooting, fault handlers can use it as a reference.

1) The set can't start or the rotation speed is too low.

Reason:	Solution:
A) Lack of battery charging	A) Check the electrolyte level, if need, please fill it. Charging the battery, if necessary, replace the battery.
B) Disconnection of the main switch	B) Close the main switch
C) A semi-automatic fuse in junction box disengaged	C) Press the button on the insurance tube, let the fuse reset.
D) Connection is bad/The line circuit	D) Exclude any circuit/poor contact failure, check whether the joints oxidation, if necessary, clean it.
E) Key switch failure	E) Replace the key switch.
F) Start relay failure	F) Replace the start relay.
G) Failure to start the motor	G) Contact with the authorized person.
H) Any start-line fault	H) Check all the other start-line.
I) Have water in diesel engine	I) Contact with the authorized repair person. Don't start the engine.
J) Low temperature lubrication oil	J) Install the oil sump heater.
K) Use wrong type lubrication oil	K) Replace lubrication oil and filter/ensure use the right type lubrication oil.
L) Other internal and external causes that impact the engine's rotation	L) Check whether the crankshaft can move flexible.

2) The engine is difficult to start or can not start, however, the exhaust pipe is smoking.

Reason:	Solution:
A) Starter motor-driven engine speed is too low	A) See "can not move the engine or a disk drive vehicle speed is too low"
B) Engine-driven equipment and motor matched	B) Turn off the engine drive device
C) Erroneous use of cold-start device	C) View the manual how to operate the cold start system
D) Preheat is not enough	D) View the manual/check the semi-automatic insurance pipe, if you need, press the reset button, check wires, chain buttons and preheat relay. If you need to replace the preheat components, contact with the authorized person.
E) Fuel filter blocked	E) Replace the fuel filter
F) Have air in fuel system	F) Let the fuel filter out
G) Oil pipeline blocked	G) Clean the pipe
H) Air intake system blocked	H) Clean the air intake pipe
I) Have water in fuel	I) Replace the fuel, install oil-water separator
J) Use the wrong type or grade fuel	J) Starting with a temporary fuel tank engines to determine
K) Injector failure or wrong type	K) Conduct a pressure test/adjust or replace fuel injector
L) Injector in, back pipe joints loose	L) Tighten the pipe joint
M) Pump failure	M) Check/repair fuel pump, if necessary, replace it

- 3) The engine can do plate movement, however, can not start, and the exhaust pipe is without smoking.

Reason:	Solution:
A) No fuel in fuel tank	A) Fill fuel
B) Fault shut-down solenoid	B) Check stop solenoid, if necessary, replace it
C) Close fuel valve failure	C) See "failure may occur of fuel off valve"
D) Injector oil-free spray	D) Loose pipe of oil pump and cylinder head, at the same time start engine, check whether there's fuel spill
E) Oil pump oil pipe joints loose	E) Tighten all the filter pipe joints of fuel tank and oil pump
F) Fuel filter blocked or fuel pipe blocked	F) Replace fuel filter, check whether fuel pipe is blocked
G) No fuel in fuel pump	G) Fill fuel to pump
H) Air intake or exhaust system blocked	H) Check whether intake and exhaust system is blocked
I) Broken oil pump drive shaft	I) Contact the dealer
J) Strain or gear pump gear wear	J) Contact the dealer
K) Fuel pump blocked	K) Check/repair oil pump, if necessary, replace it.
L) Fuel injector spray hole blocked	L) Check/clean or replace oil injector

- 4) Engine can start, however, it can not keep operating.

Reason:	Solution:
A) Have air in fuel system	A) Clean out the air in fuel, tighten joints of fuel pipe and filter
B) Fuel system leaked or blocked	B) Check the fuel tank vertical tube
C) Engine-driven equipment and motor matched	C) Turn off the engine drive device
D) Fuel filter blocked or because of low temperature, lead to fuel freeze	D) Replace the fuel filter, install fuel heater
E) Oil pipeline blocked	E) Clean the pipe
F) Use the wrong type or grade fuel	F) Starting with a temporary fuel tank engines to determine
G) Have water in fuel	G) Replace the fuel, install oil-water separator
H) Preheat is not enough	H) View the manual/check the insurance pipe, if you need, press the reset button, check wires, chain buttons and preheat relay. If you need to replace the preheat components, contact with the authorized person.
I) Air intake system blocked	I) Clean the intake pipe
J) Pressure pipe damaged	J) Install new pressure pipe

- 5) Generator running no voltage output
 - a. Check AVR' s wiring is correct and solid.
 - b. Check diesel generator' s speed.
 - c. Check generator' s remanent voltage needed magnetizing.
 - d. According to excitation separation test method' s step to check the generator and AVR.
- 6) Generator output voltage unstable
 - a. Check the stability of generator speed.
 - b. Check the stability of the settings are correct
- 7) Output voltage is too high
 - a. Check whether the generator's speed is too high.
 - b. Check generator' s overload whether the ahead of capacitive load power factor
- 8) Unload voltage is too low.
 - a. Check whether the generator's speed is too low
 - b. Check AVR wiring or external manual fine-tuning is connected intact.
- 9) Loading voltage is too low
 - a. Check whether the generator's speed is normal.
 - b. Check whether the AVR' s UFRO is correct.
 - c. According to excitation separation test method' s step to check the AVR is normal.
 - d. Rotating diode dama

8. DISPOSAL



Electrical products should not be discarded with household products. According to the European Directive 2012/19/EU on waste electrical and electronic equipment and its implementation into national law, electrical products used must be collected separately and disposed of at collection points provided for this purpose. Talk with your local authorities or dealer for advice on recycling.

9. EC DECLARATION OF CONFORMITY



Declaration of conformity

BUILDER SAS

ZI, 32 RUE ARISTIDE BERGES – 312070 CUGNAUX – FRANCE

Declares that the machinery designated below:

DIESEL GENEERATOR

FGED21000+FGED3100

Serial number: 20220725885-20220725889

20220725890-20220725894

Complies with the provisions of the Directive “machinery” 2006/42/CE and national laws transposing it:

Also complies with the following European directives:

EMC Directive 2014/30/EU

RoHS Directive (EU) 2015/863 amending 2011/65/EU

Emission directive (EU) 2016/1628 & 2018/989/EU

Noise directive 2000/14/CE Annex VI + 2005/88/CE

Also complies with European standards, with national standards and the following technical provisions:

EN60204-1:2018

EN ISO 8528-13:2016

ISO12100: 2010

EN 55012:2007+A1:2009

EN 61000-6-1:2007

Responsible for the technical file: Michel Krebs

Cugnaux, 19/10/2022

Philippe MARIE / PDG

10. WARRANTY



WARRANTY

The manufacturer guarantees the product against defects in material and workmanship for a period of 2 years from the date of the original purchase. The warranty only applies if the product is for household use. The warranty does not cover breakdowns due to normal wear and tear.

The manufacturer agrees to replace parts identified as defective by the designated distributor. The manufacturer does not accept responsibility for the replacement of the machine, in whole or in part, and/or ensuing damage.

The warranty does not cover breakdowns due to:

- insufficient maintenance.
- abnormal assembly, adjustment or operations of the product.
- parts subject to normal wear and tear.

The warranty does not extend to:

- shipping and packaging costs.
- using the tool for a purpose other than that for which it was designed.
- the use and maintenance of the machine done in a manner not described in the user manual.

Due to our policy of continuous product improvement, we reserve the right to alter or change specifications without notice. Consequently, the product may be different from the information contained therein, but a modification will be undertaken without notice if it is recognized as an improvement of the preceding characteristic.

READ THE MANUAL CAREFULLY BEFORE USING THE MACHINE.

When ordering spare parts, please indicate the part number or code, you can find this in the spare parts list in this manual. Keep the purchase receipt; without it, the warranty is invalid. To help you with your product, we invite you to contact us by phone or via our website:

- **+33 (0)9.70.75.30.30**
- **<https://services.swap-europe.com/contact>**

You must create a "ticket" via the web platform.

- Register or create your account.
- Indicate the reference of the tool.
- Choose the subject of your request.
- Describe your problem.
- Attach these files: invoice or sales receipt, photo of the identification plate (serial number), photo of the part you need (for example: pins on the transformer plug which are broken).



11. PRODUCT FAILURE

WHAT TO DO IF MY MACHINE BREAKS DOWN?

If you bought your product in a store:

- a) Empty the fuel tank if your product has one.
- b) Make sure that your machine is complete with all accessories supplied, and clean! If this is not the case, the repairer will refuse the machine.

Go to the store with the complete machine and with the receipt or invoice.

If you bought your product on a website:

- a) Empty the fuel tank if your product has one.
- b) Make sure that your machine is complete with all accessories supplied, and clean! If this is not the case, the repairer will refuse the machine.
- c) Create a SWAP-Europe service ticket on the site: <https://services.swap-europe.com> When making the request on SWAP-Europe, you must attach the invoice and the photo of the nameplate (serial number).
- d) Contact the repair station to make sure it is available before dropping of the machine.

Go to the repair station with the complete machine packed, accompanied by the purchase invoice and the station support sheet downloadable after the service request is completed on the SWAP-Europe site

For machines with engine failure from manufacturers BRIGGS & STRATTON, HONDA and RATO, please refer to the following instructions.

Repairs will be done by approved engine manufacturers of these manufacturers, see their site:

- <http://www.briggsandstratton.com/eu/fr>
- <http://www.honda-engines-eu.com/fr/service-network-page;jsessionid=5EE8456CF39CD572AA2AEEDFD290CDAE>
- <https://www.rato-europe.com/it/service-network>

Please keep your original packaging to allow for after-sales service returns or pack your machine with a similar cardboard box of the same dimensions.

For any question concerning our after-sales service you can make a request on our website <https://services.swap-europe.com>

Our hotline remains available at +33 (9) 70 75 30 30.



12. WARRANTY EXCLUSIONS

THE WARRANTY DOES NOT COVER:

- Start-up and setting up of the product.
- Damage resulting from normal wear and tear of the product.
- Damage resulting from improper use of the product.
- Damage resulting from assembly or start-up not in accordance with the user manual.
- Breakdowns related to carburetion beyond 90 days and fouling of carburetors.
- Periodic and standard maintenance events.
- Actions of modification and dismantling that directly void the warranty.
- Products whose original authentication marking (brand, serial number) has been degraded, altered or withdrawn.
- Replacement of consumables.
- The use of non-original parts.
- Breakage of parts following impacts or projections.
- Accessories breakdowns.
- Defects and their consequences linked to any external cause.
- Loss of components and loss due to insufficient screwing.
- Cutting components and any damage related to the loosening of parts.
- Overload or overheating.
- Poor power supply quality: faulty voltage, voltage error, etc.
- Damages resulting from the deprivation of enjoyment of the product during the time necessary for repairs and more generally the costs related to the immobilization of the product.
- The costs of a second opinion established by a third party following an estimate by a SWAP-Europe repair station
- The use of a product which would show a defect or a breakage which was not the subject of an immediate report and/or repair with the services of SWAP-Europe.
- Deterioration linked to transport and storage*.
- Launchers beyond 90 days.
- Oil, petrol, grease.
- Damages related to the use of non-compliant fuels or lubricants.

* In accordance with transport legislation, damage related to transport must be declared to carriers within 48 hours maximum after observation by registered letter with acknowledgement of receipt.

This document is a supplement to your notice, a non-exhaustive list.

Attention: all orders must be checked in the presence of the delivery person. In case of refusal by the delivery person, it you must simply refuse the delivery and notify your refusal.

Reminder: the reserves do not exclude the notification by registered letter with acknowledgement within 72 hours.

Information:

Thermal devices must be wintered each season (service available on the SWAP-Europe site). Batteries must be charged before being stored.



BUILDER SAS
32, rue Aristide Bergès - ZI 31270 Cugnaux – France
Made in PRC 2022