Genset Model: DB-95GF 400V | 1500rpm | 50Hz

95kW/118.75kVA Open Type/Silent Type Diesel Generator Set

Standby power	**104.5kW/130.63kVA**	**Prime power**	**95kW/118.75kVA**
Engine	**Cummins**	**Alternator**	**Shanghai Stamford**
	6BTA5.9-G2		**GR270D**
Controller	**SmartGen HGM6110N-4G-G**		

Configuration Features

Engine: Cummins **6BTA5.9-G2, MeetGB 20891-2014** China Stage II emission requirements	Alternator: Single bearing, **IP23** protection, **H** class insulation.
40/50°C genuine radiator with cooling fan and fan safety guard	Air filter, fuel filter, oil filter
Chassis and vibration absorber	Standard control panel (integrated)
24V charging generator	Gas exhaust bellows, gas exhaust elbows, industrial silencers and standard parts for connections
Electronic Governor	Accompanying documentation
Maintenance-free lead-acid batteries and battery connection cables	

Genset Model: DB-95GF 400V | 1500rpm | 50Hz

Different voltage levels

Voltage V	Frequency Hz	Phase	Power factor	Current A	Standby power	Prime Power
440/254	50	3	0.8	155.8	104.5kW/130.63kVA	95kW/118.75kVA
415/240	50	3	0.8	165	104.5kW/130.63kVA	95kW/118.75kVA
400/230	50	3	0.8	171	104.5kW/130.63kVA	95kW/118.75kVA
380/220	50	3	0.8	180	104.5kW/130.63kVA	95kW/118.75kVA

Prime power (PRP): According to GB/T 2820 (equivalent to ISO 8528), the generator can operate unlimited hours within a specified power range, allowing a cumulative 10% overload for 1 hour every 12 hours of operation.

Standby power(ESP): Standby power represents the maximum power limit for emergency use. It shall not be exceeded and is equivalent to the fuel cut-off power.

Sales Commitment:
① All products supplied by our company are brand new. Each unit undergoes strict factory test (with factory test reports provided), and we offer both on-site acceptance (at the production floor) and remote video conference acceptance.
② Warranty: 1 year or 1,000 cumulative running hours, or 15 months from the date of shipment to the first user (i.e. long-term non-installation and use), whichever comes first. Reply troubleshooting solutions by phone or video within 20 minutes, and provide remote video or on-site training for operators.
③ Services and accessories for Dingbo products are available from our headquarters.

④ Deliver goods as per the delivery date and quality requirements stipulated in the contract, and accept priority to production for urgent needs.

⑤ Provide 100% output power as per the contract requirements, and ensure that diesel engine, alternator, radiator, etc. are original and authentic products.

⑥ Strictly execute every stipulation of the contract signed and sealed by both parties.

Genset Model: DB-95GF 400V | 1500rpm | 50Hz

Engine Specifications

Manufacturer & engine Model:	Cummins **6BTA5.9-G2**	
Air intake system:	Jacket Water Aftercooled	
Fuel system:	BYC PB	
Cylinders no. & Type:	6 cylinders, in-line	
Displacement:	5.9 L	
Bore x Stroke:	102×120 mm	
Compression Ratio:	17.3:1	
Engine Speed:	1500rpm	
Engine minimum power:	106kW / 142hp	
Engine maximum power:	116kW / 155hp	
Governor system:	Electronic Governor	
Noise:	101.3dB	
Exhaust system		
Exhaust Volume:	20m^3/min	
Exhaust Gas Temperature:	570°C	
Maximum Back Pressure:	10 kpa	
Air intake/ Exhaust system		
Maximum Intake Air Restriction:	6.2kPa	
Air Flow Rate:	7.1 m^3/min	
Exhaust Gas Flow Rate:	210 m^3/min	
Fuel system		
Fuel Consumption @ 100% prime power	211g/kW·h	27L/h
Fuel Consumption @ 75% prime power	212g/kW·h	20 L/h
Fuel Consumption @ 50% prime power	219g/kW·h	14 L/h
Lubrication system		
Minimum Required Lube System Capacity - Sump plus Filters	16.4L	
Engine Oil Consumption rate:	≤2.5g/kwh	
Sump Oil Capacity:	12.3~14.2L	
Cooling System		
Total Coolant Capacity:	29L	

Maximum Top Tank Temperature for Standby Power:	104℃

Genset Model: DB-95GF 400V | 1500rpm | 50Hz

Alternator Specifications	
Meet BS5000, VDE0530, NEMA MG1-22, IEC34, CSAC22 and AS1359 standards	
Technical Data	
Phase:	3
Wire connecting method:	Y type, 3 phase 4 wire
Bearing:	1
Power Factor:	0.8 lag
Protection:	IP23
Altitude requirements:	≤1000m
Exciter type:	Brushless Self-Excited
Insulation/temperature rise class:	H/H
Waveform **TIF**:	<50
Waveform**THF**:	<2%
Rated Capacity:	**120kVA**
Efficiency:	90.6%
Genset Technical Specifications	
Voltage adjustment rate:	≥±5%
Steady-state voltage regulation rate:	≤±1%
Transient voltage deviation (100% sudden power reduction):	≤+25%
Transient voltage deviation (sudden power increase):	≤-20%
Voltage stability time (100% sudden power reduction):	≤6S
Voltage stability time (sudden power increase):	≤6S
Frequency adjustment rate:	0-5%
Steady-state frequency band:	≤1.5%
Transient frequency deviation (100% sudden power reduction):	≤+12%

Transient frequency deviation (sudden power increase)：	≤-10%
Frequency stability time (100% sudden power reduction)：	≤5S
Frequency stability time (sudden power increase)：	≤5S

ATS Function and Selection of Diesel Generator Set

The ATS (Automatic Transfer Switch) of a diesel generator set is a critical device for ensuring continuous power supply. Its primary function is to initiate an automatic start command to the backup power source upon failure of the main power source (utility power). Once the generator set successfully starts, the ATS automatically transfers the electrical load to the standby power source (the diesel generator set), ensuring critical loads remain powered without interruption. The following is a detailed introduction to ATS：

1. Core Functions of ATS

- **Automatic Main Power Monitoring**: Continuously monitors the utility power supply for abnormalities in voltage and frequency stability.
- **Automatic Generator Start Command**: Initiates generator startup upon detection of utility power failure, under-voltage, or unstable frequency.
- **Automatic Load Transfer to Backup Power**: Transfers electrical loads to the generator after it reaches rated voltage and frequency.
- **Automatic Utility Power Restoration**: Switches loads back to the utility supply upon its recovery, then initiates sequential generator shutdown (including cool-down).
- **Backfeed Prevention**: Ensures complete electrical isolation between utility and generator sources to eliminate backfeed hazards to the grid or equipment.

2. Composition Structure of ATS

- **Switch Body**: Dual-Power Switching Mechanism (featuring mechanical interlock design to prevent simultaneous closure).
- **Control module**: Microprocessor or PLC, used for logical judgments and sequence control.
- **Sensors**: Detect voltage, frequency, phase and other parameters.
- **Operation interface**: Manual/automatic switch button, status indicator light, alarm function.
- **Communication interface (optional):** Supports remote monitoring (such as Modbus, RS485).

3. ATS Operational Sequence

1. **Monitoring Stage:** ATS continuously monitors the utility power status.
2. **Start Signal Trigger**： Upon utility power failure, after a programmable time delay (to avoid false triggering by momentary fluctuations), the ATS sends a start signal to the generator.
3. **Transfer Stage**: After generator stabilization(typically within 5~30 seconds), the ATS disconnects the utility power and transfers the loads to the generator supply.
4. **Retransfer Stage:** When utility power is restored and stabilized, the ATS switches the load back to utility power. The generator then operates under no-load condition for cooling before shutting down.

4. Types of ATS

- **Open transition type (Break-Before-Make)**: Disconnects the primary power before connecting the backup source, resulting in a brief power interruption (millisecond range), suitable for general loads.
- **Closed Transition type (Make-Before-Break)**: Short overlapping power supply (synchronous detection required), seamless switching, suitable for precision equipment (such as data centers, medical facilities).
- **Delayed Transition type**: Avoid frequent switching during transient faults (e.g., lightning strikes).
- **Manual Priority Type**: Allows operator override for controlled manual switching sequences.

5. Key parameters for selection

- **Rated current/voltage:** Match the load power and system voltage (e.g. 400V, 250A).
- **Switching time:** Typically 10-30 seconds (including generator start-up time); faster in critical scenarios (e.g. within 5~10 seconds).
- **Poles**: 3 poles (three-phase electricity) or 4 poles (with neutral line switching).
- **Certification standards:**: Compliant with safety regulations such as IEC 60947-6-1, UL 1008, etc.
- **Environmental adaptability:** Protection class (e.g., IP65), operating temperature range.

6. Application Scenarios

- **Data centers and hospitals:** Places with extremely high requirements for power supply continuity.
- **Factories and commercial buildings:** Avoid production interruptions or equipment damage.
- **Communication base stations:** Rely on generators where there is no stable utility power in remote areas.
- **Emergency power supply (EPS):** Integrated with UPS systems to provide long-term backup power.

7. Maintenance and Precautions

- **Regular Testing:** Simulate utility power failure to verify switching function.
- **Contact Inspection:** Prevent oxidation or wear that could cause poor contact.
- **Battery Backup:** Ensure control circuits can still operate during power outages.
- **Phase synchronization:** Detect the phase difference between utility power and the generator during switching to avoid shock.

8. Common brands

- **High-end:** ASCO, GE Zenith, Socomec
- **Mid-range:** ABB, Schneider, Siemens
- **China Local Brands**: Chint, Delixi, People Electric

9. Comparison with Manual Transfer Switches

- **Manual Transfer Switches:** Require manual operation, incur longer response delays , suitable for non-critical loads.
- **ATS**:Deliver full automation with rapid response, eliminating human error.

Proper ATS selection and maintenance significantly enhance diesel generator system reliability, ensuring seamless power continuity for critical facilities during grid outages

Power Correction Reference At Different Altitudes

① Rated power output conditions at standard operating altitude:

Below 1000 meters: The generator set operates stably at rated power;

1000 meters to 4000 meters, please refer to the standard operation correction in the table below.

② Power correction

Below 3000m altitude: Derate 4% per 500m increase

Above 3000m altitude: Derate 6% per 500m increase

For concurrent high ambient temperatures (>40°C): Apply additional 1.5% derating per °C increase

Impact of Altitude on Diesel Generator Performance::

① Decreased combustion efficiency:

For every 1000-meter increase in altitude, atmospheric pressure drops by 10%, and oxygen content reduces by 6% to 10%. This results in insufficient air intake for naturally aspirated or diesel engines, causing incomplete combustion of diesel fuel. Consequently, power loss can reach 8% to 12%.

② Deterioration of starting performance

Low air pressure leads to insufficient temperature at the compression end in the combustion chamber. At 10°C, starting capability or power output may decrease by 50% compared to sea-level conditions.

③ Reduced cooling system efficiency

The boiling point decreases as altitude increases (reduced to approximately 87% at 4,000 meters altitude), which leads to a 30% drop in heat dissipation efficiency;

Based on the above situation, technical measures for adapting to high temperature and altitude:

① Opt for a high-altitude air filter, featuring high flow rate, low resistance, and designed for dust-prone environments;

② Increase radiator surface area by 20%-30% and upgrade to high-pressure-ratio cooling fans to prevent overheating.

Equip with preheating system: Water jacket heater (maintain block temperature > 32°C), fuel pipe Electric Heat Tracing.

Low-temperature lubricating oil: Use low-viscosity oils such as SAE 5W-40 to reduce resistance.

Shorten maintenance intervals: air filter replacement frequency increased by 50% (due to high dust on the plateau).

Coolant monitoring: Use Ethylene glycol mixture (freezing point < -25°C) with regular pH testing to prevent corrosion.

Altitude(m)	Power correction factor	Example: 1000KW actual output power
≤1000	100%	1000KW

1500	96%	960KW
3000	88%	880KW
4000	76%	760KW

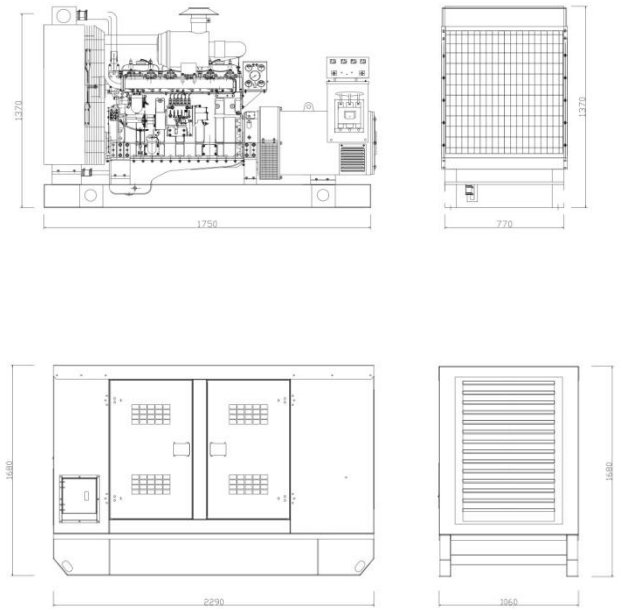
Standard Configuration

Auto-Start Control System: Dingbo LCD display controller supports real-time parameters display (voltage, frequency, running time, etc.) and fault alarm (speed governing failure , high coolant temperature, under -voltage, etc.)	Smoke exhaust system (to the muffler): within 6 meters	Accompanying data: factory test report for diesel generator, operation manual, certificate of conformity, etc.
Oil drain valve: oil pipe in and out of the engine	Maintenance-free battery and battery cables:100A	Circuit breaker: Yangzhou Shuoyang 250A
Vibration-damper	Battery box	Base frame: Made of carbon steel Q235B/Q355B (≥6mm thick plate)
Cummins engine 6BTA5.9-G2	Shanghai Stamford alternator GR270D	Hot-dip galvanized chassis
Cummins 6BTA5.9-G2 original 40°C/50°C Radiator	Float Charging	

Optional Equipment

Daily fuel tank	Rainproof generator	Remote control module
Anti-condensation heater	Super silent canopy generator	Parallel and grid-connected systems
Spare parts	Silent canopy generator	Switchgear
ATS Automatic Transfer Switching Cabinet	Silent canopy air inlet filter	Oil-water separator(1125N-010)
Fuel Filter(1117N-010)	Trailer generator	Fire extinguisher
Remote monitoring system	Oil filter(1012N-010)	External rainproof socket
Tracked intelligent control base frame	Air filter (KW2140C1)	Self-elevating 360° illumination tower (Optional Power Configurations)

Dimension and weight



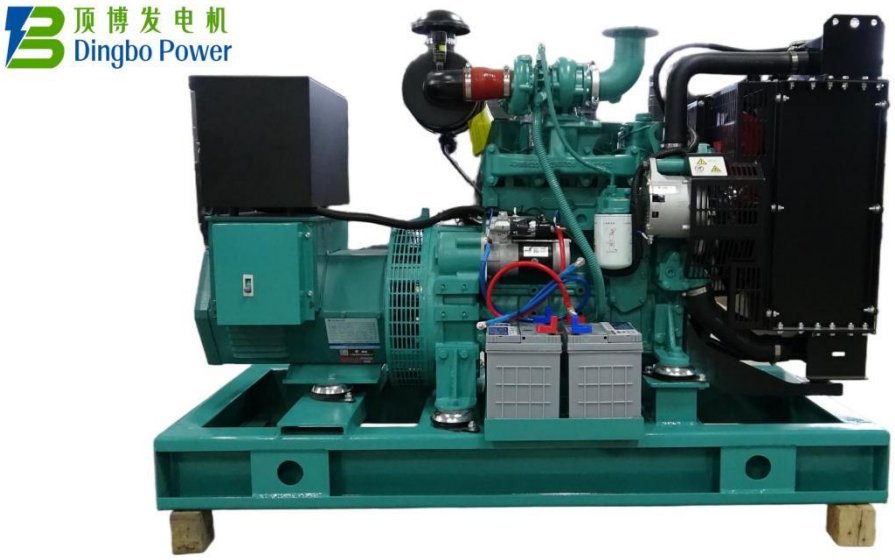
Open Type
Dimension(L x W x H):**2300×800×1600 mm**
Weight:**1320kg**

Silent canopy type
Dimension(L x W x H): **3000×1240×1790 mm**
Weight: **1850kg**

This data sheet is for reference only and subject to change without notice.

1. 95kW Open Type Diesel Generator Set with Cummins engine 6BTA5.9-G2 and Shanghai Stamford alternator GR270D

Introduction of Manufacturing Process and Structural Design



① Base and frame

(1)Material and Strength: The welded base is made of ≥ 6 mm thick high-strength carbon steel (Q235B/Q355B). The thickness of the bottom reinforcing ribs is ≥50% of the main body. Employs Complete Joint Penetration (CJP) welds compliant with AWS D1.1 / GB 50661 standards. The sampling rate for Ultrasonic Testing (UT) of welds ≥20%.

(2)Dimensional Accuracy: Base frame flatness≤ 0.5 mm/m, anchor bolt hole positional deviation ≤ ±1.0 mm, ensuring unit levelness ≤ 0.5 mm/m.

(3)Vibration Damping Integration: The base built in anti-vibration rubber pads (Shore hardness 70±5). The shock absorber mounting surface is pre-compressed to 10% of the static load to eliminate tolerance. The horizontal displacement limit gap is 3~5mm.

② Surface treatment and spraying requirements

These are crucial, as they directly affect the corrosion resistance, service life, and appearance quality of the generator set. Below are detailed requirements and suggestions：

[1] Surface Treatment Requirements (Pre-treatment)

(1)Degreasing: Use specialized alkaline cleaning agents or solvents to thoroughly remove contaminants such as oil, grease, cutting fluids, and rust preventive oil from the surface of the chassis steel. Ensure a hydrophilic surface is achieved (indicated by a continuous, unbroken water film).

(2) Rust removal: Preferred method: Sandblasting or shot blasting treatment.

Cleanliness Grade: Reaches Sa 2.5(Very Thorough Blast Cleaning).

Standard: The steel surface shall be free from visible grease, dirt, mill scale, rust, paint coatings, and foreign matter. Any remaining traces shall consist only of slight stains in the form of spots or streaks.

Abrasives: Steel shot, steel grit, or a mixture of these abrasives is recommended. The abrasives should be clean, dry, and free of oil contamination.

Roughness: After sandblasting, a specified surface roughness (Rz) should be achieved, typically within the range of 40-70 μm (1.6-2.8 mil). This helps enhance the mechanical interlocking and adhesion between the coating and the substrate.

③ **Spraying requirements (coating system)**

Adopt a high-performance anti-corrosion coating system, consisting of at least a double-layer coating of primer + topcoat.

1.Primer：

Type: Two-component epoxy zinc-rich primer is the preferred choice.

Advantages: Provides excellent cathodic protection (sacrificial anode), extremely strong adhesion, excellent rust protection and chemical resistance. The zinc powder content in zinc-rich primer (based on dry film) should generally be ≥ 70%.

Alternatives： Two-component epoxy zinc phosphate primer.

Advantages: Provides excellent rust protection performance and adhesion; exhibits good compatibility with various topcoats. Zinc-free formulation makes it more environmentally friendly, generating less welding fumes, which is suitable for occasions with restrictions on zinc powder or as a substitute for zinc-rich primer.

Dry Film Thickness: 60 - 80 μm (2.4 - 3.2 mil).

2. Intermediate coating (optional, highly recommended for heavy corrosion protection or harsh environments):

Type: Two-component epoxy (micaceous iron) intermediate coat.

Advantages: Provides excellent shielding effect (blocks water vapor and oxygen penetration), increases overall coating thickness, and improves corrosion resistance and durability. Flake pigments (such as mica iron oxide) can effectively extend the penetration path of corrosive media.

Dry film thickness: 50 - 70 μm (2.0 - 2.8 mil). Together with primer + topcoat, forms a complete protective system.

3. Topcoat：

Type: Two-component polyurethane topcoat is the preferred choice.

Advantages: Excellent weather resistance (good retention of gloss and color), outstanding abrasion resistance, good chemical resistance (including resistance to minor oil stains and fuels), good decorative appearance and gloss.

Alternatives: Two-component acrylic polyurethane topcoat or high performance alkyd enamel.

Acrylic polyurethane has weather resistance close to that of polyurethane, and its cost may be slightly lower.

High-performance alkyd enamel has low cost and easy application, but its weather resistance, abrasion resistance, and chemical resistance (especially oil resistance) are far inferior to polyurethane. It is suitable for less demanding applications or indoor environments.

Dry Film Thickness: 50 - 70 μm (2.0 - 2.8 mil).

Color: Typically medium gray, dark gray, yellow, red, or other industry-standard colors for construction machinery are selected or customer-specified colors. The specific color is determined based on customer requirements or the manufacturer's standard color chart.

4.Total dry film thickness:

Minimum requirement: ≥ 160 μm (6.3 mil). Recommended target thickness: 180 - 220 μm (7.1 - 8.7 mil).

It is essential to ensure that all areas, especially those prone to corrosion such as corners, welds, recesses, bolt holes, and cut edges, meet the specified film thickness requirements. Particular attention should be paid to spraying techniques or performing pre-coating in these critical zones.

④ Spray Process Specifications

1. Environmental Control:

Temperature: Both the substrate temperature and ambient temperature should be within the range specified in the coating product instructions (typically above 5°C for epoxy paint and above 10°C for polyurethane paint).

Humidity: Relative humidity should generally be < 85%. Construction should be avoided during rainy, foggy, snowy weather or when condensation occurs on surfaces.

Ventilation: Provide good ventilation to ensure solvent evaporation, while avoiding direct strong airflow on the painted surface to prevent issues such as dry spray and orange peel.

2.Mixing and Induction Time: Strictly adhere to the precise ratio of Component A (base material) and Component B (hardener) as specified in the Technical Data Sheet (TDS) provided by the coating supplier.

Thoroughly mix using a power mixer until uniform.

After mixing, two-component coatings must undergo Induction Time before Spray Application.

3. Spray Application method：

Preferred method: Airless spraying, with high efficiency, uniform film thickness, good appearance, and excellent coverage, particularly well-suited for large-scale applications.

Auxiliary: Brush or roller coating. Pre-coating is performed on areas difficult to spray such as welds, corners, bolt holes, and complex structures to ensure adequate coating coverage and thickness at these critical areas.

Avoid dry spraying (The paint mist does not wet the substrate sufficiently).

4. Film thickness control：

During and after Spray Application, use wet film thickness gauges and dry film thickness gauges to perform multi-point measurements (as required by relevant standards such as ISO 19840 or SSPC-PA2) to ensure compliance with the specified dry film thickness (DFT).

Areas with insufficient film thickness should be repainted in time.

5. Recoating Interval: Strictly adhere to the minimum and maximum recoating intervals specified in the paint supplier's TDS.

When the maximum overcoat interval is exceeded, the existing coating surface must be profiled (such as scraping or light sandblasting) and thoroughly cleaned before the next coat of paint can be sprayed.

6. Curing:

The coating needs to be fully cured (usually several days) under specified environmental conditions (temperature, humidity) to achieve optimal performance. During curing, exposure to water, oil contamination, and mechanical damage should be avoided.

⑤ Quality Inspection

1. Surface cleanliness: Visual inspection after sandblasting, reaching Sa2.5 standard (no oil, no dirt, no oxide scale, no rust, only slight spots/streaks are allowed).

2. Roughness: Use a roughness meter to spot check when necessary to ensure it is within the range of 40-70μm.

3. Adhesion: After the coating is fully cured, conduct adhesion testing according to standards (such as ISO 4624 pull-off method or ASTM D3359 tape Test). The pull-off result should be ≥5 MPa (700 psi) to be qualified.

4. Dry film thickness: Perform multi-point measurements according to standard, ensuring the total DFT ≥160μm, with over 90% of measurement points achieving or exceeding the specified minimum thickness, and no points falling below 80% of the specified thickness.

5. Appearance: The coating should be continuous, uniform, and smooth (or possess the specified texture as required), free from noticeable defects such as sagging, blistering, pinholes, cracking, missed spray, dry spray, orange peel, or foreign particles. The color shall conform to the required specifications.

⑥ Packaging and transportation protection

After the chassis coating is completed, during storage and transportation, removable rubber or plastic corner protectors/sleeves should be installed on vulnerable areas such as edges, corners, and protrusions that are prone to impact damage.

Avoid using packaging materials that are easy to fade or react with paint (such as low-quality wrapping film) to directly contact the paint surface.

Ensure the chassis is securely strapped during transport to prevent friction or collision between chassis units or with other hard objects.

Summary of key points:

Sandblasting to Sa 2.5 grade + appropriate roughness is the basis of corrosion protection longevity.

Two-component epoxy zinc-rich primer + two-component polyurethane topcoat constitutes the standard high-performance, durable coating system. For severe environments, add an epoxy intermediate coat.

Total Dry Film Thickness (DFT) ≥ 160μm. Ensure adequate thickness of critical areas like corner welds (apply pre-coating).

Grind sharp edges to a radius ≥ 2mm (R≥2mm).

Strictly control application conditions and process parameters (mixing ratio, induction time, recoat interval, film thickness).

Strictly conduct quality inspections (surface cleanliness, roughness, adhesion, film thickness, appearance).

Suggestions:

Guangxi Dingbo Generator Set Manufacturing Co.,Ltd, selects industrial protective coating products from well-known brands.

Designate to experienced and qualified coating construction teams.

Strictly follow the product technical specifications (TDS) and construction guidelines provided by the coating supplier.

Following the above requirements can ensure that the chassis of the open-type diesel generator set possesses excellent corrosion resistance and long-lasting protection, enabling it to perform reliably even in relatively harsh operating environments.

If you have specific coating brand preference, environmental conditions at the project site (such as coastal high-salt-fog, corrosive gases in chemical areas, etc), or stricter specification requirements (like ISO 12944 C4/C5 environmental ratings), you can customize the product in Guangxi Dingbo Generator Set Manufacturing Co., Ltd.

The open type diesel generator set of Cummins engine 6BTA5.9-G2 paired with copy Stamford alternator GR270D, integrates manufacturing processes that combine precision engine manufacturing, alternator electromagnetic design, and whole set machine assembly technology. The core process can be divided into the following three steps:

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1. Engine Manufacturing Process（Cummins 6BTA5.9-G2）

1. Core component manufacturing

Cylinder Block and Cylinder Head: Made of high-strength cast iron. The cylinder liner surface are processed with plateau honing technology, to form a micron-level mesh oil storage pattern which significantly reduces the risk of oil leakage and improves wear resistance.

Crankshaft and Camshaft: Made of forged steel, subjected to heat treatment and dynamic balancing calibration (residual unbalance ≤1 g•cm) to ensure stability at high rotational speeds.

Integrated design: The cylinder block integrates multifunctional components (such as cooling water channels and oil circuits), reduces 40% of connectors, and improves structural rigidity and fault tolerance.

2. Fuel and Governing System

- Equipped with a BYC PB type high-pressure fuel pump and an electronic governor (steady-state speed fluctuation rate: ±0.25%) to achieve precise fuel injection control, with a specific fuel consumption as low as 211 g/kW • h.

- Holset wastegate turbocharger optimizes turbine response and enhances low-end torque..

3. Assembly and testing

- Key bolts (such as cylinder head and crankshaft bolts) are tightened according to standard torque (such as crankshaft bolt torque 120±5N•m) and marked with anti-loosening marks.

-Complete cold test (no load) and hot test (load test) to verify the oil pressure (≥345kPa) and cooling system sealing.

2. Alternator production process (Shanghai Stamford GR270D)

1. Stator manufacturing

Core Processing: Utilizes 0.35 mm silicon steel laminations stamped and stacked. The outer circumference is then turned (with a machining allowance of 0.5–1 mm) to ensure core-to-stator frame concentricity ≤φ0.05 mm, reducing electromagnetic vibration.

Winding process: Features a 2/3-pitch skewed slot winding design to suppress third harmonics and minimize voltage waveform distortion (THD ≤8%). Coils employ Class H mica-powder tape insulation, multi-glue molded and cured, with a temperature resistance of 180°C.

2. Rotor and excitation system

-The salient pole rotor is dynamically balanced (Grade G2.5) and paired with an AVR (Automatic Voltage Regulator) module, to achieve a ±1% steady-state voltage regulation and supports 100% instantaneous load.

-Brushless excitation design, the rotating rectifier is sealed in the rotor to avoid carbon brush wear.

3. Anti-corona treatment

The slot section is coated with low-resistance anti-corona paint, and the end section is covered with high-resistance anti-corona tape to prevent partial discharge under high electric field, meeting the environmental requirements of altitude ≤1000m.

3. Assembly and testing process

1. Power coupling:

– The diesel engine and alternator are directly connected through the SAE flywheel housing and high-elastic coupling, with coaxiality calibration ≤0.05mm to reduce vibration transmission.

2. Control system integration:

- Equip with an LCD controller for real-time monitoring of voltage, frequency, and oil pressure. Supports remote fault diagnosis (e.g., SMS alerts).

- Optional ATS (Automatic Transfer Switch) cabinet enables seamless switching between utility power and generator power.

3. Whole machine performance test:

Load Test: 0-100% step load testing to verify transient voltage regulation (-15% / +20%) and frequency recovery time (3 seconds).

Endurance Test: 12-hour continuous operation (including 1 hour at 110% overload), monitoring temperature rise, emissions, and abnormal vibration.

Summary

This open type genset achieves reliable power supply through high-precision power coupling (Cummins integrated diesel engine + Shanghai Stamford brushless alternator), strict thermal management (enclosed water cooling + IP23 protection) and intelligent control (AVR voltage regulation + LCD monitoring), and is suitable for communication base stations, construction site backup power supply and other scenarios. Its core technological advantages are:

① Failure rate control (40% parts reduction of diesel engine + brushless generator design);

② Power quality optimization (voltage distortion ≤8%, frequency fluctuation ≤1.5%);

③ Environmental adaptability (supports −40°C cold start, full power output at an altitude of 1000m).

2. 95kW Silent Diesel Genertaor Set with Cummins engine 6BTA5.9-G2 and Shanghai Stamford alternator GR270D

Introduction of Manufacturing Process and Structural Design

Use at an ambient temperature above 50°C

Use at an ambient temperature below 40°C

A. Structure design for silent canopy

1. Enclosure Design & Dimensions

- Rectangular structure: Adopts optimized rectangular design (DB-95GF dimensions: 3000×1240×1790mm)balancing spatial efficiency and manufacturability. Length accommodates diesel engine, alternator, silencer system, and ventilation ducts (intake plenum + exhaust chamber).

- Functional Zoning: Divided into an intake side (alternator end) and an air exhaust side (diesel engine end). The intake area must be larger than the radiator heat dissipation area. The standard soundproof air velocity is ≤8m/s, and the super silent type is ≤6m/s to avoid secondary wind noise.

Access Doors: An operation door with a tempered glass viewing window (alternator end) and two maintenance doors (both sides). Maintenance doors provide access for three-filter replacement (air/fuel/oil), battery service, coolant level checks and so on. Door edges feature EPDM (ethylene propylene diene monomer) sealing strips with a compression set ≤30%.

2. Noise reduction system design

- Multi-layer Acoustic Wall: Composite structure: Outer steel shell (2-3mm) → Damping layer (butyl rubber) → Sound-absorbing cotton(50-300mm polyester fiber) → Perforated interior panel (φ3mm holes). Total thickness: 150-500mm (200mm typical for 95kW units).

Labyrinth ventilation ducts: Intake/exhaust ports feature three-layer acoustic labyrinths extending airflow paths for enhanced attenuation. Air velocity controlled to ≤5 m/s.

Exhaust Silencing: Utilizes impedance-reactive composite mufflers (multi-chamber expansion design) with backpressure ≤5 kPa and insertion loss ≥15dB @ 200Hz..

3. Auxiliary function integration

Base Frame Fuel Tank: Integrated 8-hour runtime fuel tank at rated load, elevating the unit height for easier operation.

- Rain and dust proof: Intake/exhaust vents with fixed/motorized louvers + gas-strut sealed covers. With roof-mounted weather hood and bottom weep holes for drainage.

- Safety devices: Externally mounted emergency stop button and internally wrapped exhaust pipes with ceramic fiber blanket (650°C continuous rating).

B. Material selection:

Component Material Type Specifications/Performance Requirements.

| Enclosure Body | Galvanized steel(Q235/SPCC) | Thickness: 2-3mm|

| Damping layer | Butyl rubber/asphalt based damping pads | Thickness: 2-5mm, elongation at break ≥300% |

| Acoustic layer | Environmentally friendly polyester fiber cotton/Melamine foam | Density ≥80kg/m^3, NRC ≥0.95 |

| Interior panels | Perforated aluminum sheet/Galvanized perforated sheet | Aperture φ3mm, opening area rate: 30% |

| Seals | Ethylene Propylene Diene Monomer(EPDM) | Temperature resistance range: -50℃ ~150℃ , Compression set ≤30% |

| Vibration Isolators | Rubber Mounts | Service life ≥ 20,000 hours|

C. Production process

1. Sheet Metal Fabrication

-Laser cutting: Steel plates are precisely cut according to the drawings, with a tolerance of ±0.5mm.

-Bending & Forming: Corners are bent using a press brake (R≤1mm). Box body seam connections are fully welded and ground smooth for sound leak-proofing.

2. Noise Reduction Structure Assembly

- Press-bond multiple layers in sequence: outer shell → spray damping adhesive → attach sound-absorbing cotton → fix perforated plate.

- Embed fiberglass wool within noise-attenuating channels, featuring a wedge-shaped tip design to enhance low-frequency sound absorption coefficient (125Hz≥0.8).

3. Functional component integration

- Shock absorber installation: Silicone rubber pads are installed between the diesel engine and the base, and calibrate the coaxiality of the alternator coupling to ≤0.05mm.

- Exhaust system: The muffler is flexibly connected to the exhaust pipe to avoid vibration transmission.

D. Surface treatment and spraying proces

1. Pretreatment

-Degreasing & Phosphating Alkaline degreasing → Water rinsing → Surface conditioning → Zinc phosphating (coating weight: 2-3 g/m^2),to enhance coating adhesion.

- Drying: Forced drying in an oven room at 80°C for 10 minutes.

2. Electrostatic powder spraying

- Powder type: epoxy polyester mixed type(TGIC-Free), Weather resistance≥1,000 hours(QUV test).

- Process Parameters: Spray gun voltage 60-90kV， atomizing air pressure 0.5-0.8MPa， curing conditions 180°C×20 mins, film thickness 80-120μm.

- Special Treatment: Spray epoxy zinc-rich primer (zinc content ≥ 80%) + polyurethane wear-resistant topcoat on the bottom of the box to resist stone chip impact.

3. Quality Control Points

- Clean the spray gun electrode regularly to avoid electrical leakage caused by paint adhesion.

- Coating hardness≥2H(pencil hardness), salt spray resistance > 500 hours， complying with the GB 15607-2023 explosion-proof requirements.

E. Noise reduction performance verification

Noise reduction measures	Technical Parameters	Result
Sound insulation of enclosure	32dB(A) @500Hz	Block airborne sound transmission
Sound-Absorbing Cotton NRC	0.95(Full frequency range)	Reverberation Noise Reduction≥20dB
Vibration Damper Efficiency	Vibration transmissibility <5%	Structure-Borne Noise Attenuation≥15dB
Whole-Machine Noise Level	at 1 meter≤85dB(A)	at 7 meter≤75dB(A), compliant with ISO 8528

Summary: Core advantages of silent canopy

- **Ultra-low noise**:Through composite sound insulation wall + labyrinth ventilation + impedance muffler, noise level≤65dB at 7m (surpasses the national standard requirement of LP7m≤85dB).

- **Environmental Adaptability**: IP23 protection rating with -40℃ cold-start capability (requires anti-condensation heaters) .

- **Long lifespan design**: Galvanized steel sheet + anti-corrosion electrostatic spray coating, ensures the canopy lifespan >15years, shock absorber fatigue resistance≥20,000 hours, 6mm thick galvanized steel plate provides exceptional rust and corrosion resistance; air intakes feature dual-stage filtration (filter element + mesh screen) to prevent sand/dust ingress and block wildlife entry.

- **Innovative Manufacturing:** Laser cutting/bending to ensure sealing; Zinc phosphate conversion + zinc-rich epoxy primer for dual corrosion protection; sound-absorbing cotton and perforated plate combination to optimize acoustic performance.

3. Generator Room Design and Requirements for 95kW/118.75kva Diesel Generator Set

A. Installation environment core requirements

1. Ventilation and Heat Dissipation

- Air inlet/outlet design:

- Alternator end requires sufficient air intake area (≥1.5 × radiator surface area), and engine end requires high-efficiency exhaust outlet (≥1.5 × radiator surface area).

- Inadequate air intake will lead to incomplete combustion, carbon deposition, and reduced load capacity. Insufficient exhaust ventilation will cause oxygen deficiency in the room, affecting generator performance.

- Exhaust Pipe specifications:

- Exhaust pipe diameter ≥ muffler outlet diameter, elbows≤3pcs, 5°–10° downward slope to prevent rainwater ingress; Vertical installation requires a rain cover.

- Exhaust back pressure≤10kPa, to ensure unimpeded gas flow.

2. Space and layout

- Equipment spacing:

- Reserve a 1-1.5m maintenance passage around the unit and a 1.5-2m space on the top (no stacking of debris allowed).

- The distance between multiple units is ≥2.5m to avoid thermal interference.

- Foundation requirements:

- The concrete foundation must be level (calibrated with a level tool). Install special shockproof pads or bolts between the unit and the foundation.

- The open-type DB-95GF generator set weighs 1320kg; foundation design must reserve 1.5× safety margin for load-bearing capacity.

3. Environmental & Safety Requirements

- Corrosion Protection: Keep away from sources of acidic/alkaline corrosive gases to prevent corrosion of metal components.

- Explosion and fire prevention: Strictly prohibit open flames and smoking in the generator room, equip with dry powder fire extinguishers and a fire sand bucket (≥0.5m^3). And the fuel storage room should be isolated.

- Grounding System:

- The unit casing is grounded for protection; Independent neutral-point earthing (prohibit sharing utility ground) with lightning arresters.

- Automatic transfer switches require utility authority certification to prevent backfeed hazards.

B.Generator room design standards

1. Location and structural requirements

- Siting Constraints::

- The ideal position is on ground floor or basement levels B1/B2. Prohibited in lowest basement level. Avoid areas above assembly occupancies, restrooms, or main building entrances.

- Adjacent to substations to minimize feeder length (low-voltage runs ≤200m).

- Building Separation Requirements:

- ≥2-hour fire-rated walls + ≥1.5-hour fire-rated floors forming independent fire zones; The oil storage room is isolated by fire wall + Class A fire door.

2. Fuel storage system specifications

- Fuel storage room design:

- Fuel storage capacity≤8 hours fuel consumption (DB-95GF consumes ≈14L/h @ 50% load) with total volume ≤1m^3 .

- Tank vent lines extended outdoors + floor containment sump for leak prevention..

- Fuel Supply requirements:

- Tier III hospitals require minimum 24-hour supply (requires external bulk tanks); Tier II hospitals require minimum 12-hour supply.

3. Ventilation & Noise Reduction

- Forced Ventilation:

- Closed-loop water-cooled units require mechanical supply/exhaust ventilation; intake airflow ≥ 1.8 × radiator surface area.

- Exhaust temperature ≤60℃ to avoid thermal recirculation.

- Noise Reduction Measures:

- Fill the wall with sound-absorbing cotton(NRC≥0.95), and install a silencer on the exhaust pipe; open type units:102dB@1m, silent canopy unit needs to be reduced to≤65dB/7m.

4. Emergency and auxiliary systems

- Fire Protection Configuration:

- Install automatic gas suppression system in generator room, and equip exterior with fire hose cabinets and emergency lighting.

- Control Room Requirements:

- Single units ≥500 kW or multiple generator installations require a dedicated control room, and the distance between the switchgear panel and generators ≥1.5 meters.

Key requirements for DB-95GF generator room

Number of exhaust pipe elbows	≤3pcs
Fuel storage room capacity	≤1m^3(approx. 230L diesel).
Grounding resistance	≤4Ω(Independent grounding).
** Startup time **	≤15 Sec (Tier III hospitals).
Noise limit (residential area)	≤65dB/7m (silent canopy).
Air inlet area ≥1.5 × radiator area(≈0.6m^2)	

C. Summary: Design points and common problems

- Acoustic enclosure dimensions for DB-95GF diesel generator: 3000(L)×1240(W)×1790(H) mm, Reserve lifting lugs(≥2×unit footprint) and transport pathway.

- Specific requirements of hospitals:

- for Grade I special critical loads (such as operating rooms) , install UPS to bridge 15-second generator startup gap, with diesel genset as backup.

- Fire protection loads must connect to the backup power supply and strictly prohibited from sharing circuits with the emergency power supply.

- Typical error avoidance:

- Never position exhaust outlets near fresh air intakes; ordinary wooden doors are strictly prohibited on fuel storage room; Basement generator room requires moisture-proofing and drainage facilities.

Guangxi Dingbo Generator Set Manufacturing Co.,Ltd, recommends that users entrust qualified and licensed electromechanical design institutes for detailed engineering drawings.

4. Dingbo Cloud Remote Monitoring Management System

Our diesel generator sets are equipped with the "Dingbo Cloud" monitoring and management system, which can remotely manage the diesel generator sets.

Transform Reactive Maintenance into Proactive Management

Dingbo Power's newly developed diesel generator sets utilize the Dingbo cloud monitoring and management system. With customer's authorization, we can remotely manage the operation, fault troubleshooting, and maintenance of customer's generator sets with this system. Customers can remotely monitor and control their units via mobile phones and computers, achieves an integration featuring remote video surveillance, monitoring, management, and service, to enhance management efficiency and business benefits.

Confronting today's fiercely competitive market, equipment manufacturers must prioritize market dominance and deliver exceptionally responsive after-sales service. However, traditional service models operate reactively: only upon equipment failure do users notify suppliers, who then dispatch technicians for on-site repairs. Crucially, users often lack specialized knowledge of diesel generators, leading to inaccurate fault descriptions that prevent suppliers from making precise diagnoses. When technicians arrive without required spare parts—unpredictable due to vague initial reports—repairs face prolonged delays, incurring substantial labor, equipment downtime, and operational costs that indirectly inflate overall system expenses.

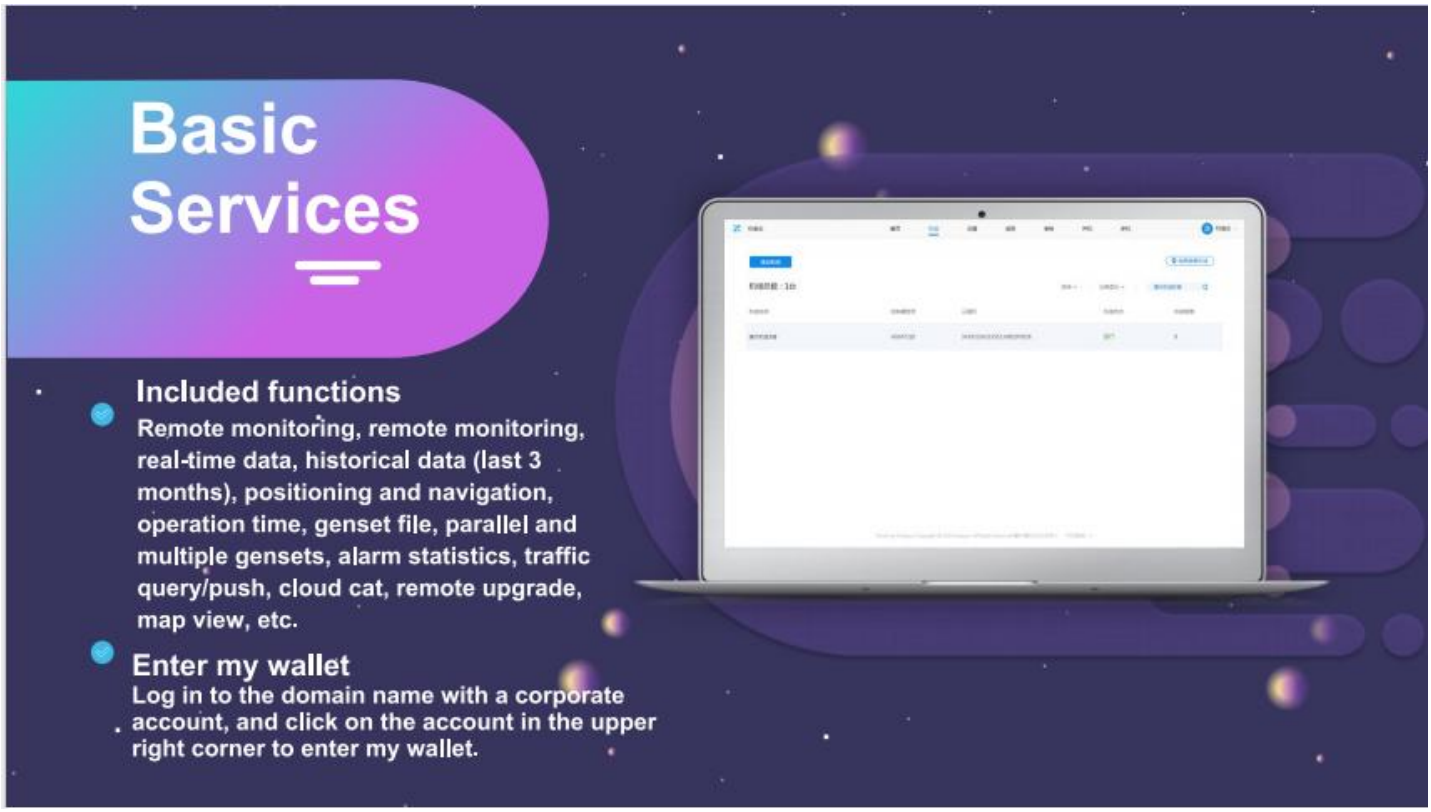
To reduce costs while accelerating service delivery and minimizing client losses, our company invested significant R&D resources to develop the Dingbo Cloud System, launched in late 2020. This platform enables remote diagnostics and proactive maintenance, transforming service efficiency.

The remote diagnosis and maintenance system has the advantages of real-time remote, shared diagnostic resources, and high efficiency. The realization of these advantages must be based on the "Dingbo Cloud" system. **Once authorized by customers, our company can assist in managing their generator sets through the cloud platform. Upon identifying issues, it will be fed back to the after-sales service department in time, and then the technical service personnel stationed at the location of generator set will be dispatched to contact the user's operator for maintenance. If the operators cannot resolve the issue, our professional technicians can provide support through remote video assistance or on-site visits for maintenance and repairs. This enables proactive maintenance rather than passive waiting.**

The main functions of the system include: remote monitoring, remote measuring, real-time data, historical data (in recent 3 months), positioning navigation, operating time, unit archives, parallel multi-machine, alarm statistics, traffic check/push, cloud cat remote upgrade, map viewing, etc.

1. Basic functions

Remote monitoring, remote measuring, real-time data, historical data (in recent 3 months), positioning navigation, operating time, unit archives, parallel multi-machine, alarm statistics, traffic check/push, cloud cat remote upgrade, map viewing, etc.



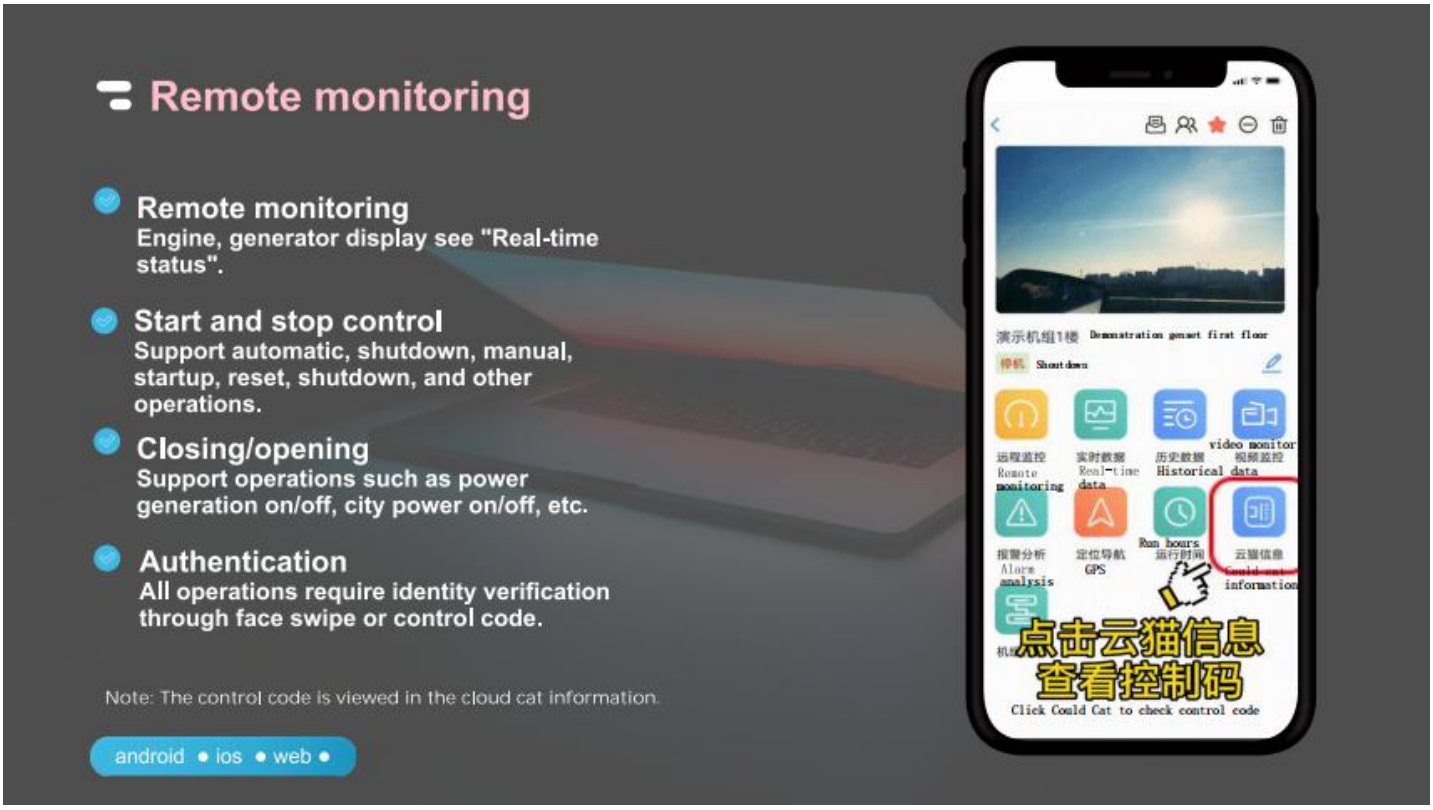
2. Remote monitoring

(1) Remote Monitoring: Engine and alternator status is displayed in "Real-time Status"；

(2) Start/Stop Control: Supports Auto, Stop, Manual, Start, Reset, and Shutdown operations:

(3) Closing/opening: supports power generation closing/opening, and utility power closing/opening, etc.;

(4) Identity Authentication: All operations require facial recognition or control code verification.



3. Remote measuring

(1) Measuring engine speed, water temperature, oil pressure, liquid level, battery voltage, and charge voltage;

(2) Measuring alternator output power, power factor, three-phase current, three-phase voltage, frequency, etc;

(3) Check the status of the unit through the monitoring controller; control steps require identity verification.

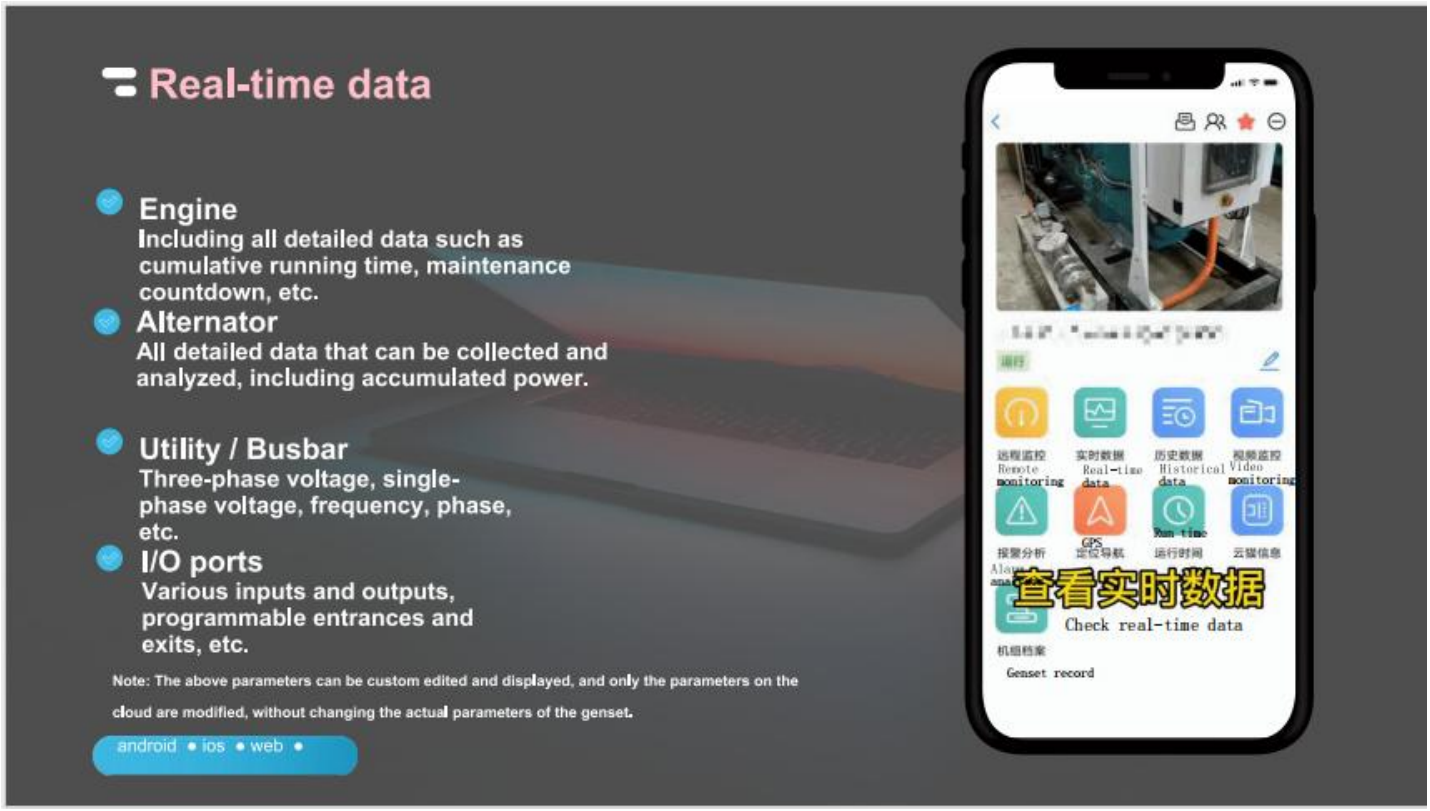
4. Real-time data

(1) Include all data such as cumulative operating hours and maintenance countdown of the engine;

(2) Include all collectible and analyzable data such as cumulative electrical energy of the alternator;

(3) Utility power/Busbar three-phase voltage, single-phase voltage, frequency, phase, etc.;

(4) All I/O port inputs/outputs, as well as programmable input/output, etc..



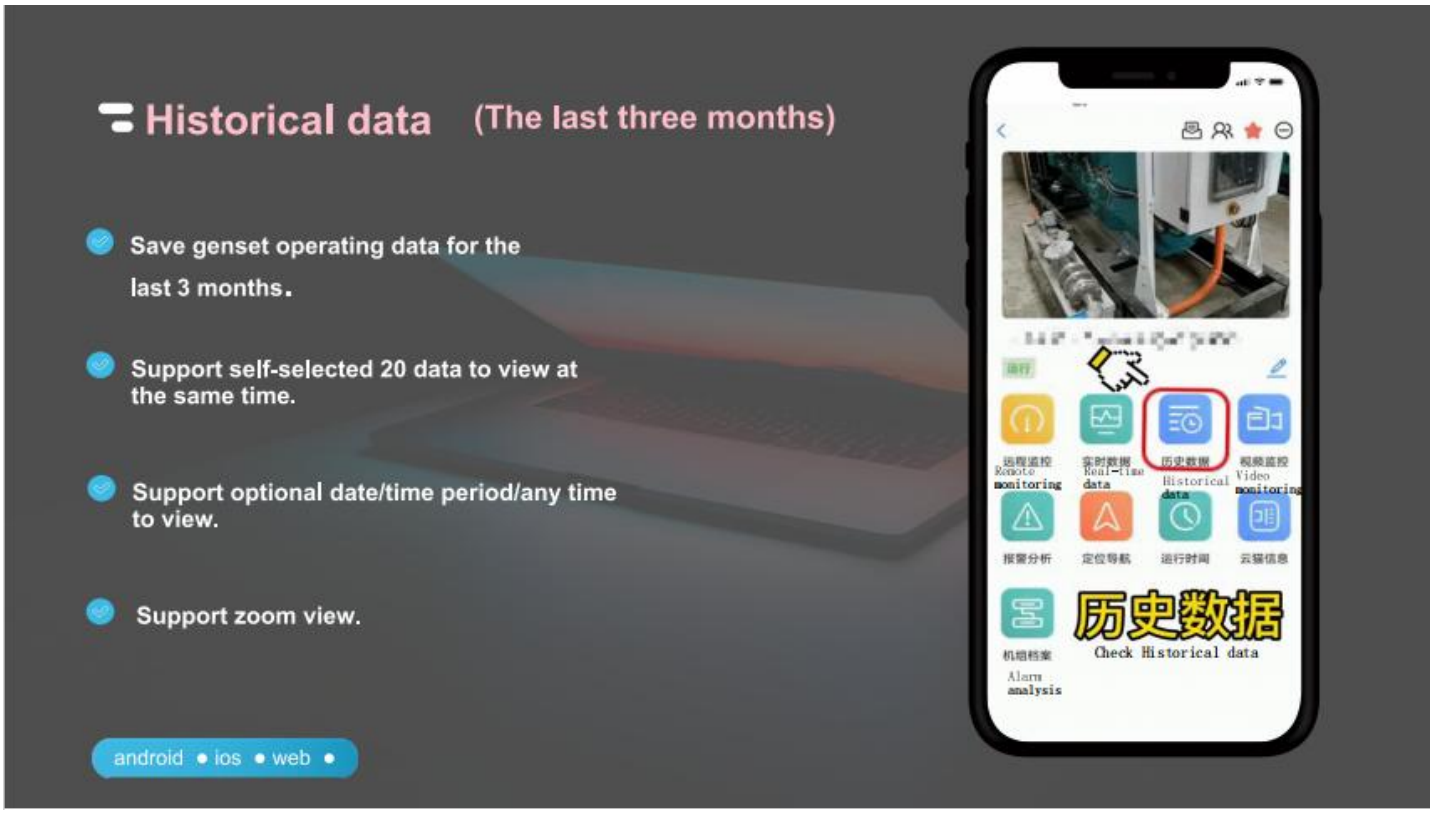
5. Historical data

(1) Save the unit's operating data in recent 3 months;

(2) Support viewing 20 items of data at the same time;

(3) Support viewing at any date/time period/time;

(4) Support zoom viewing.

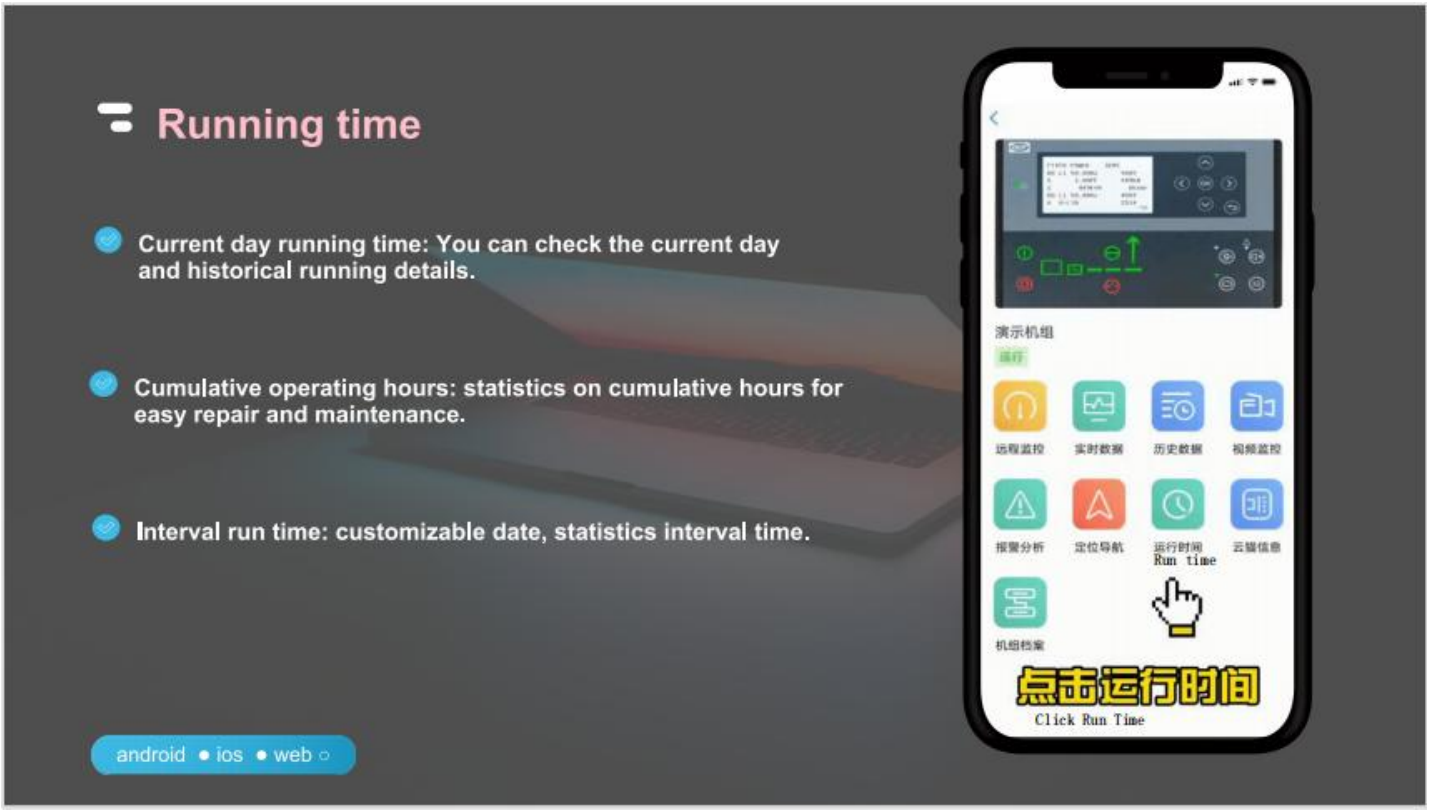


6. Operating time

(1) Daily running time: Can check the operational details for the current day and historical days;

(2) Cumulative running time: Calculate the total accumulated operating time to facilitate maintenance.

(3) Interval Runtime: can select the date and count the interval running time.



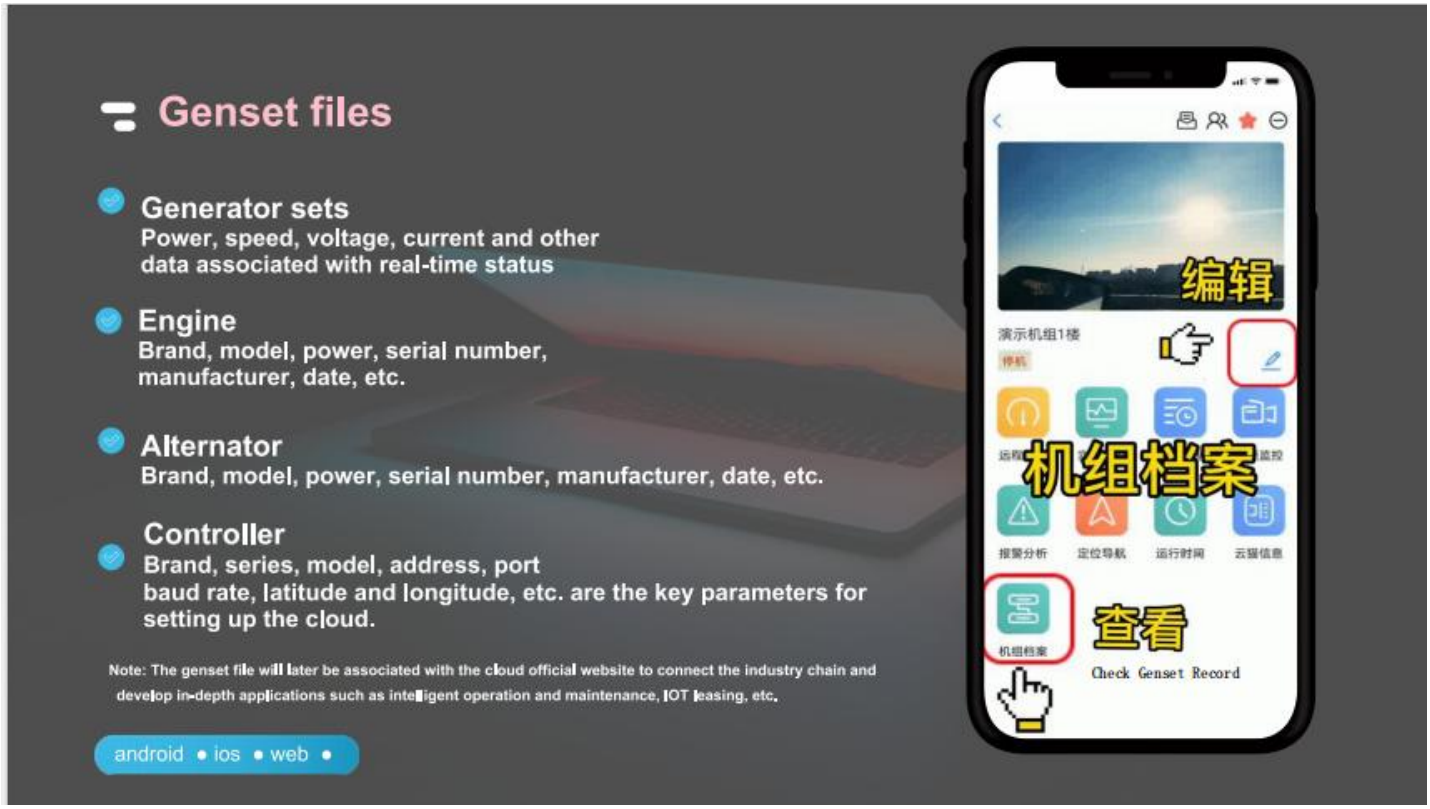
7. **Check generator set archives**

(1) Generator set: Data such as power, speed, voltage, and current are associated with the real-time status;

(2) Engine: Brand, engine model, power, serial number, manufacturer, and manufacture date;

(3) Alternator: Brand, alternator model, power, serial number, manufacturer, and manufacture date;

(4) Controller: Brand, series, model, address, port, baud rate, longitude and latitude, etc. are key parameters for cloud settings.



8. Parallel/multi-unit management

(1) Paralleling Operation Management: Established based on the paralleling controller, units cannot be added repeatedly. Internal members can be added, and external users can be invited via a Parallel Group ID;

(2) Multi-Unit Management: Group management according to different members, regions, customers, etc. Internal members can be added, and external users can be invited using a Group ID;

(3) Multi-Unit Monitoring, Single-Unit Control, Unlimited units, multi-personnel management.

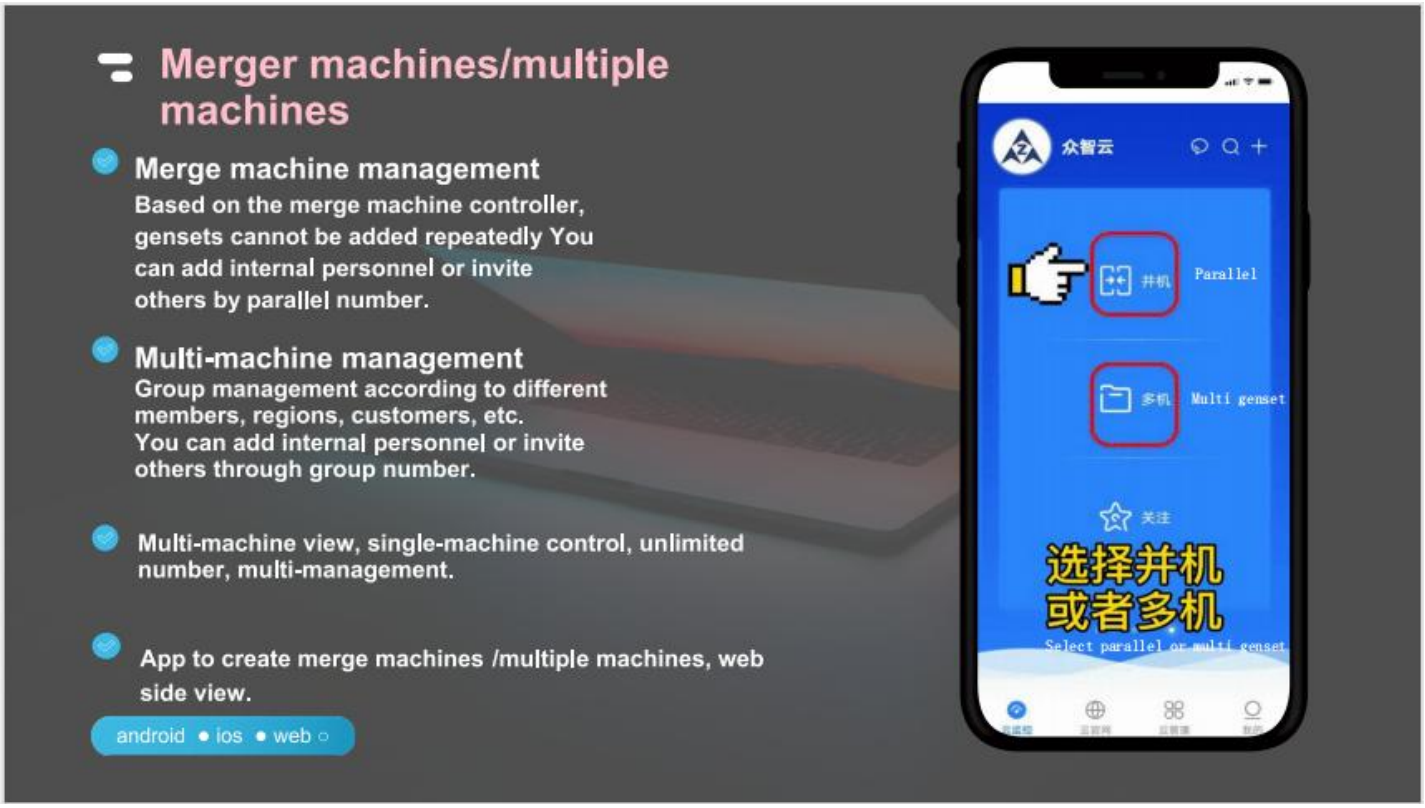
(4) Create paralleling/multi-unit groups via App and monitor systems via Web platform.

9. Alarm statistics:

(1) Statistics Data: Access statistics for all units under the platform via the bottom-left corner of the homepage;

(2) View current Alarms: Check the total number of alarms, number of units generating alarms, and detailed alarm list.

(3) View historical alarms: Alarm statistics, trend curves, and detailed list for the past week, the past month, and the past three months.



9. Remote configuration

(1) Remotely set and modify parameters;

(2) Supports host software for controllers, engines, and alternators;

(3) Accessible for remote configuration via both mobile devices and computers.

11. Remote Lockout:

(1) Remotely send lockout commands to controllers, disabling their operation;

(2) Lockout can only be initiated when the generator set is stopped; not permitted during operation;

(3) For safety, remote lockout capability is exclusively configured for enterprise accounts.

5. Routine Maintenance

1. Routine Maintenance Intervals

Item	Requirement	Replacement Specification
Oil filter, diesel filter	After first 60 hours of operation	Replace with CI-4/CK-4 Grade 15W-40 oil (9.5L) rotary filter
Oil filter, diesel filter	250 hours or six months	Replace with CI-4/CK-4 Grade 15W-40 oil(9.5L) rotary filter
fuel filter	500 hours or 12 months	Replace dual-stage filter (coarse filtration + fine filtration)
Air filter	1000 hours or by pressure indicator	Replace when air restriction indicator shows red or the pressure difference reaches 725kpa; Reduce interval by 50% in dusty environments.
Coolant	2 years or 4000 hours	Replace with 50% ethylene glycol mixture (freezing point ≤-40°C) with DCA4 corrosion inhibitor to maintain concentration.

Note: Maintenance and replacement shall be conducted as per the standards in the instruction manual.

2. Key wearing parts

Item	Replacement Interval	Replacement Criteria	Brand
V-Belt	1500 hours	Crack/wear > 1.5mm, Tension<350N	Cummins Specific
Battery	2-3years	Starting voltage <24V（Normal≥24V）	Genset Specific
Fuel Injection Nozzle	1500 hours-2000 hours	Oil dripping →carbon deposits, cylinder knocking	Cummins Specific
Water pump mechanical seal	2500 hours-3000 hours	Coolant leakage → cylinder scuffing due to overheating	Cummins Specific
Injector seal ring	Replace each time the injector is removed	Diesel leaks into the oil pan, causing oil dilution and oil level rise	Cummins Specific
Turbocharger Bearing	8000 hours	Abnormal noise/sudden increase in oil consumption (0.5L/100ND)	Cummins Specific
Alternator AVR module	2 years or 10000 hours	Breakdown and burnout→ Overvoltage damage to equipment	Cummins Specific
Oil pressure sensor	As needed (fault)	Failure to alert abnormal oil pressure→ poor lubrication→ Bearing seizure→ Bearing damage	Cummins Specific
Coolant	As needed (fault)	False overtemp alarm→ False	Cummins

temperature sensor		shutdown protection trigger; Failure→ Overheating-induced cylinder scuffing	Specific
Speed sensor	As needed (fault)	Signal loss→ Engine fails to start or runs unstably	Cummins Specific

3. Common failures and solutions

Common failure		Symptom	Cause	Solution
Starting system failure	Failure to start	The starting motor does not rotate or rotates at insufficient speed	Low battery voltage(<22V) or the terminals are corroded; Starter relay/contactor failure; Starter motor carbon brush wear	Measure battery voltage, charge or replace; Short-circuit test for relay contacts; Replace damaged parts, disassemble and inspect the motor, and replace the carbon brushes.
	Stops immediately after start	Shuts down after start within 3-5 seconds	Fuel system air intake Shutdown solenoid valve failure Oil pressure switch failure	Bleed the fuel filter air Manually hold the solenoid valve to test; Short circuit pressure switcher verification.
Fuel system failure	Insufficient power	The speed drops significantly under load	Fuel filter is clogged (pressure difference > 50kPa) Plunger wear in fuel injection pump (fuel supply pressure<18MPa) Poor atomization of the fuel injection nozzle (oil dripping)	Replace dual-stage filter (coarse filter + fine filter); Professional pump calibration (adjusting the fuel supply advance angle); Ultrasonic clean fuel injectors
	Severe black smoke	Black smoke from the exhaust accompanied by power loss	Air filter is clogged(pressure difference > 25kPa) Turbocharger oil leak; Abnormal valve clearance (insufficient air intake).	Replace the air filter(per ISO 5011); Check the supercharger axial clearance(should be<0.15mm); Adjust valve clearance(cold engine state: air intake

				0.25mm/ exhaust 0.50mm)
Lubrication system failure	Low oil pressure	Warning light is always on (pressure <0.15MPa)	Oil dilution (of fuel) The clearance of the oil pump gear is too large(> 0.20mm); Main bearing wear	Check the oil viscosity（(should be >12cSt at 40°C); Measure the oil pump end clearance(standard 0.05-0.15mm); Need to overhaul and check the bearing.
	Abnormal oil consumption	Refill every 100 hours > 1L	Piston ring gap alignment or wear(cylinder pressure<2.5MPa) Turbocharger oil seal leakage	Cylinder pressure test; Check the turbocharger vent port for oil residue.
Cooling system failure	Water temperature overheat	Water temperature > 95℃ alarm	Thermostat stuck (test start temperature 82-88℃); Radiator is clogged (dust accumulation between fins > 50%); Pump impeller corrosion	Boiling water test for thermostat High-pressure air gun backwashing radiator; Check pump discharge capacity (should be > 80L/min)
	Coolant Leakage			pump mechanical seal (drip > 3 drops/min need to be replaced); Cylinder head gasket (cylinder head bolt torque needs to be re-tightened to 120±5Nm).
Electrical system failure	No power generation		Testing steps: Measure residual magnetic voltage (should be > 3V AC) Check AVR fuse (usually 5A)	Exciter magnetization (12V battery touches momentarily F+/F-); Replace with the same model AVR(±1% regulation).

			Test rotating diode(forward resistance<1Ω，reverse ∞)	
	Voltage fluctuations		Excitation carbon brush bouncing (Replace if length<15mm); Non-linear load (UPS/inverter) interference.	Polish the slip ring (roughness Ra≤1.6μm) Install harmonic filter
Control system failure	Failure to operate of ATS	Troubleshooting process: Simulate utility power failure (detect PLC output signal) Check the limit switch of the switching motor Testing mechanical interlocks		Maintenance points: Monthly manual switching test Apply conductive paste to contacts
	Frequent protection shutdowns	Key points to check: Oil pressure sensor(resistance changes linearly with pressure) Water temperature sensor (resistance is about 180Ω at 100℃) Overcurrent relay (action value should be 110% of rated current)		
Typical mechanical failures	Abnormal vibration	Diagnostic method: Disassemble the coupling and test the engine separately; Perform dynamic balancing (vibration value should be<7.1mm/s).		Common causes: Crankshaft bending(radial runou > 0.05mm); Flywheel bolts loose (need to be tightened in diagonal order).
	Abnormal exhaust noise	Judgment: Crisp metallic sound: valve clearance is too large. Dull knocking sound: connecting rod bearing clearance exceeds the standard(> 0.10mm).		

Critical safety notices:

Before servicing high-pressure fuel systems, always depressurize by loosening the injector end nuts and pumping manually.

Before electrical work, disconnect battery negative terminal.

After shutdown, allow turbocharger to idle-cool for 3 minutes.

Suggest refer to the Cummins 6BTA5.9-G2maintenance manual and the Copy Stamford GR270D technical specifications

Summary: The core maintenance for the Cummins 6BTA5.9-G2 engine is regularly replacing the three filters and engine oil, while strictly adhering to fuel quality requirements and usage environments. For operation in plateau regions, extreme cold, sandy/dusty conditions, or areas with high salinity, alkalinity, acidity, or elevated temperature/humidity, dedicated kits must be installed or custom-configured units must be procured. Pre-operation checks are mandatory before every use. Recommendation: Conduct a comprehensive performance inspection every 1,500 operating hours.

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