

300kVA Generator Datasheet PDF - Complete Technical Specifications and Download Guide

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Introduction

The 300kVA generator represents a significant capacity threshold in industrial power generation, delivering substantial power output for large-scale commercial operations, critical infrastructure, and industrial applications. This comprehensive datasheet provides complete technical specifications, performance characteristics, and application guidance for 300kVA diesel generator sets, serving as the definitive reference for engineers, project managers, and facility operators responsible for power system design, installation, and maintenance.

Capable of delivering 240kW of prime power at 0.8 power factor, the 300kVA generator addresses the power requirements of large facilities, mission-critical operations, and substantial industrial processes. These units bridge the gap between medium-capacity generators and large industrial power plants, offering excellent power density, fuel efficiency, and operational flexibility. The 300kVA capacity is particularly well-suited for applications requiring reliable backup power for entire facilities or prime power for remote installations and construction projects.

Advanced engineering in modern 300kVA generators incorporates emissions-compliant engines with sophisticated fuel injection systems, robust alternators with advanced voltage regulation, and intelligent control systems enabling remote monitoring, automatic synchronization, and comprehensive protection. The integration of digital control technology ensures optimal performance across varying load conditions while meeting stringent environmental regulations and emissions standards across global markets.

Technical Specifications

Engine Specifications

Parameter	Specification
Prime Power Output	300 kVA / 240 kW
Standby Power Output	330 kVA / 264 kW
Rated Voltage	400V / 230V (3-phase)
Rated Frequency	50 Hz
Rated Current (Prime)	433.0 A
Power Factor	0.8 (lagging)
Engine Type	4-cycle, Turbocharged Intercooled Diesel
Number of Cylinders	6 or 8
Displacement	9.0L - 12.0L
Bore x Stroke	Varies by manufacturer
Compression Ratio	15.5:1 - 17.0:1
Aspiration	Turbocharged with air-to-air charge cooling
Governor Type	Electronic

| Governor Class | ISO 8528-5 Class G3 |

Fuel System Specifications

| Parameter | Specification |

|-----|-----|

| Fuel Consumption (100% Load) | 62-72 L/hr |

| Fuel Consumption (75% Load) | 48-55 L/hr |

| Fuel Consumption (50% Load) | 35-40 L/hr |

| Fuel Type | ASTM D975 No. 2-D Diesel |

| Fuel Tank Capacity (Base) | 400-600 L |

| Fuel Tank Capacity (Optional) | Up to 1500 L |

| Fuel Injection System | Common rail or electronic unit injector |

| Fuel Filter Type | Multi-stage with water separator and priming pump |

Electrical Specifications

| Parameter | Specification |

|-----|-----|

| Alternator Type | Brushless, self-excited, self-regulated |

| Insulation Class | H |

| Protection Class | IP23 (standard) / IP44 (optional) |

| Voltage Regulation | $\pm 0.5\%$ (steady state) |

| Frequency Regulation | $\pm 0.25\%$ (isochronous) |

| THD (Total Harmonic Distortion) | $< 4\%$ |

| Transient Response (Load Step) | Recovers to $\pm 10\%$ within 2.5 seconds |

| Starting Capability | 70% of rated kVA in one step |

| Alternator Cooling | Self-ventilated with external fan |

Physical Specifications

| Parameter | Specification |

|-----|-----|

| Length (Canopy) | 3200-3800 mm |

| Width (Canopy) | 1200-1500 mm |

| Height (Canopy) | 1700-2000 mm |

| Dry Weight (Canopy) | 3200-4200 kg |

| Operating Weight | 3700-4800 kg |

| Sound Level at 1m (Canopy) | 70-78 dB(A) |

| Sound Level at 7m (Canopy) | 60-68 dB(A) |

| Cooling System | Radiator with belt-driven fan |
 | Coolant Capacity | 35-50 L |

Environmental Specifications

Parameter	Specification
Operating Temperature Range	-20°C to +50°C
Storage Temperature Range	-40°C to +65°C
Altitude Capability	Up to 1000m (standard), derate above
Humidity	Up to 95% non-condensing
Emissions Compliance	EU Stage V / EPA Tier 4 Final

Performance Curves Description

Load-Fuel Consumption Curve

The fuel consumption curve for a 300kVA generator exhibits the characteristic non-linear relationship between electrical load and fuel consumption. At 25% load (75 kVA), the unit consumes approximately 22-26 liters per hour, representing roughly 35-38% of full-load consumption. This relatively high consumption at low loads reflects the fixed overhead of engine friction, pumping losses, and auxiliary systems.

As load increases to 50% (150 kVA), fuel consumption rises to approximately 35-40 L/hr, demonstrating improved specific fuel consumption due to higher thermal efficiency at moderate loads. The most efficient operating range lies between 65-85% load, where the generator achieves optimal brake specific fuel consumption. At 75% load (225 kVA), consumption reaches 48-55 L/hr with excellent fuel economy per kilowatt-hour generated.

Full-load operation at 300 kVA requires 62-72 L/hr depending on ambient conditions, fuel quality, and engine calibration. Extended operation below 30% load should be avoided to prevent wet stacking, cylinder glazing, and reduced engine efficiency. Modern electronic engines with common rail injection systems offer improved low-load performance compared to mechanical injection systems.

Temperature Derating Curve

Ambient temperature affects generator output through several mechanisms including reduced air density, reduced cooling capacity, and increased electrical resistance. Standard ratings apply at reference temperatures of 25°C or 40°C. Above 40°C, derating factors of approximately 1.5-2% per 5°C apply. At 50°C ambient, output may be limited to 93-96% of rated capacity.

Charge air cooler effectiveness becomes increasingly important at higher ambient temperatures, as the temperature of air entering the engine directly affects combustion efficiency and maximum power output. Alternator temperature rise also contributes to overall derating requirements in high-temperature installations.

Altitude Derating Curve

High altitude operation presents challenges due to reduced air density affecting both engine performance and cooling system effectiveness. Standard ratings apply up to 1000 meters elevation. Above this threshold, derating

of 3-4% per 500 meters typically applies. At 2000 meters, expect approximately 88-92% of rated capacity. At 3000 meters, output may decrease to 78-85% of sea-level rating.

Turbocharged engines with intercoolers generally perform better at altitude than naturally aspirated units due to the turbocharger's ability to partially compensate for reduced air density. However, both engine and alternator cooling systems may require enhanced capacity for high-altitude installations.

Load Step Response Curve

The load step response characteristics of a 300kVA generator demonstrate its ability to accept sudden load applications while maintaining stable voltage and frequency. With modern electronic governing, these units can typically accept 70% of rated load (210 kVA) in a single step while maintaining voltage deviation within $\pm 12\%$ and frequency deviation within $\pm 8\%$.

Recovery time to steady-state voltage typically ranges from 1.5-3 seconds, with frequency recovery occurring within 2-4 seconds. The response characteristics depend on engine technology, alternator design, and control system calibration. For applications with large motor starting requirements, sequential loading or reduced voltage starting methods may be necessary.

Compatible Applications

Large Commercial Complexes

300kVA generators provide comprehensive backup power for large office buildings, shopping centers, hospitals, educational institutions, and mixed-use developments. These units can support complete facility operations including HVAC systems, elevators, lighting, security infrastructure, and IT systems. The substantial capacity enables true facility-wide backup rather than critical loads only.

Industrial Manufacturing

Manufacturing facilities, process plants, and industrial operations rely on 300kVA generators for production equipment, process controls, material handling systems, and environmental controls. The robust industrial-grade construction withstands harsh environments while providing reliable power for continuous or intermittent operations critical to production schedules.

Healthcare Institutions

Large hospitals, medical centers, and healthcare facilities require substantial backup power for life-safety systems, surgical suites, imaging equipment, patient care areas, laboratory services, and pharmaceutical refrigeration. Regulatory requirements mandate reliable backup power with automatic transfer and regular testing protocols.

Data Centers

Medium-sized data centers, colocation facilities, and enterprise IT operations depend on 300kVA generators for primary backup power. These applications require clean, reliable power with fast response times and seamless transfer from UPS systems. Generator reliability directly impacts data center uptime and service level agreements.

Telecommunications Infrastructure

Central offices, switching facilities, and telecommunications hubs require robust backup power to maintain connectivity during utility outages. 300kVA generators provide extended runtime capability with substantial fuel reserves, ensuring continuous operation of critical communication infrastructure.

Water and Wastewater Facilities

Municipal water treatment plants, pumping stations, and wastewater facilities utilize 300kVA generators for pumps, blowers, chemical systems, and control infrastructure. Reliable backup power ensures continuous operation essential for public health, environmental protection, and regulatory compliance.

Mining and Resource Extraction

Mining operations, drilling sites, and remote resource extraction facilities use 300kVA generators as prime power for equipment, camp facilities, and processing operations. The robust construction and substantial output capacity suit these demanding applications in challenging environments.

Download PDF Section

Official Datasheet Downloads

Complete technical datasheets for 300kVA generators are available from manufacturer websites and authorized distributors. These comprehensive PDF documents include detailed specifications, performance curves, dimensional drawings, electrical schematics, installation guidelines, and maintenance procedures. When requesting documentation, specify the exact model, emissions tier, voltage configuration, and optional features.

Documentation Package Contents

A complete 300kVA generator documentation set typically includes:

- Detailed technical specification sheet
- Performance curves (fuel consumption, derating, transient response)
- Dimensional drawings with connection points
- Electrical schematics and wiring diagrams
- Control panel documentation and operation manual
- Foundation and mounting requirements
- Fuel system design guidelines
- Ventilation and exhaust specifications
- Maintenance schedule and procedures
- Parts catalog with component specifications
- Installation and commissioning checklist
- Warranty terms and registration information

Technical Support Resources

Manufacturer technical support provides assistance with:

- Application engineering and system design
- Sizing calculations and load analysis
- Installation and commissioning support
- Troubleshooting and diagnostics
- Spare parts identification and supply
- Training programs for operations staff
- Software updates and configuration support

Frequently Asked Questions

1. What is the fuel consumption per hour for a 300kVA generator?

A 300kVA generator typically consumes 62-72 liters per hour at full load (300 kVA / 240 kW). At 75% load, consumption drops to approximately 48-55 L/hr. At 50% load, expect 35-40 L/hr. Actual consumption varies based on engine technology, load profile, and ambient conditions.

2. What size cable do I need for a 300kVA generator?

For a 300kVA generator with rated current of 433A at 400V, copper cables of 2x240mm² or 3x185mm² per phase are typically required, depending on installation method and ambient temperature. Cable sizing must account for current carrying capacity, voltage drop, and fault current rating. Consult local electrical codes and engage a qualified electrical engineer.

3. How much load can a 300kVA generator carry?

A 300kVA generator can deliver 240 kW of prime power at 0.8 power factor. For standby applications, it can provide up to 264 kW for limited duration. The generator can support total connected loads equal to its rating, but motor starting and load characteristics may require additional capacity or reduced voltage starting methods.

4. What maintenance does a 300kVA generator require?

Maintenance includes daily inspections (fluid levels, visual checks), weekly test runs, monthly battery and transfer switch tests, quarterly filter inspections, semi-annual comprehensive inspections, and annual major service including oil, filters, coolant, and component inspection. Follow manufacturer-specific maintenance schedules.

5. Can a 300kVA generator run 24 hours a day?

Prime-rated 300kVA generators are designed for continuous operation at varying loads with periodic maintenance shutdowns. Standby-rated units are intended for limited hours during utility outages. Continuous operation requires adequate fuel supply, ventilation, cooling, and regular maintenance per manufacturer guidelines.

6. What is the difference between prime and standby rating for a 300kVA generator?

Prime rating allows unlimited operating hours per year at variable loads up to the rated output, with an average load factor not exceeding 70%. Standby rating applies to emergency backup applications with operating hours typically limited to 200 hours per year at rated output with no overload capability.

7. How long will a 300kVA generator last?

With proper maintenance and operation, a 300kVA diesel generator can achieve 25,000-35,000 operating hours before major overhaul. In standby applications with limited running hours, service life typically ranges from 25-35 years. Maintenance quality, operating conditions, and loading practices significantly affect longevity.

8. What emissions standards apply to 300kVA generators?

300kVA generators are subject to emissions regulations depending on the region and application. In the EU, Stage V standards apply to all generator sets. In the US, EPA Tier 4 Final regulations apply. Some regions offer exemptions for emergency standby generators. Verify local requirements before purchase.

9. Can I parallel two 300kVA generators?

Yes, two 300kVA generators can be paralleled to provide 600 kVA total capacity when equipped with appropriate synchronizing controls, switchgear, and protection systems. Paralleling requires matching voltage, frequency, phase rotation, and control characteristics. Both manual and automatic synchronizing systems are available.

10. What size transfer switch do I need for a 300kVA generator?

For a 300kVA generator with 433A rated current, a 500A or 630A automatic transfer switch is typically recommended. The ATS should be rated for the application class (emergency, legally required, or optional standby) and comply with relevant standards such as IEC 60947-6-1 or UL 1008.

11. What is the recommended fuel tank size for a 300kVA generator?

Base fuel tanks typically hold 400-600 liters, providing 6-10 hours of operation at full load. For extended runtime, additional day tanks or bulk storage tanks may be required. Consider fuel consumption rates, delivery schedules, and regulatory requirements for fuel storage when sizing fuel systems.

12. How do I calculate generator sizing for my application?

Generator sizing requires summing all connected loads, applying demand factors for loads that don't operate simultaneously, considering motor starting requirements, and adding margin for future expansion. Peak starting currents often determine generator size rather than running loads. Use manufacturer sizing software or consult a qualified engineer.

13. What is the noise level of a 300kVA generator?

Open-set 300kVA generators produce approximately 85-95 dB(A) at 1 meter. Sound-attenuated canopy units reduce noise to 70-78 dB(A) at 1 meter and 60-68 dB(A) at 7 meters. Ultra-silent enclosures can achieve levels below 65 dB(A) at 7 meters for noise-sensitive applications.

14. What type of oil does a 300kVA generator use?

Modern 300kVA generators typically use SAE 15W-40 or 10W-40 heavy-duty diesel engine oil meeting API CI-4 or CJ-4 specifications. Some applications may require synthetic oils for extended drain intervals or extreme temperature operation. Always follow manufacturer recommendations for oil type and viscosity.

15. How often should I test my 300kVA generator?

Standby generators should be tested weekly or monthly depending on application requirements and regulatory standards. NFPA 110 recommends weekly inspections and monthly load tests of at least 30 minutes duration under available load. Healthcare facilities have specific testing requirements per regulatory standards.

Related Downloads

Engine Technical Documentation

- Cummins QSL9-G5 Engine Specifications
- Perkins 2506C-E15TAG1 Technical Manual
- Volvo Penta TAD1352GE Engine Datasheet
- Deutz TCD 2015 V8 Engine Manual
- MTU Series 2000 Engine Specifications

Alternator Documentation

- Stamford S6L1S Alternator Datasheet
- Leroy Somer LSA47.2 Technical Manual
- Mecc Alte ECO49-1S/4 Specifications
- Marathon Electric 444 Datasheet
- Siemens 1FC6 Series Technical Data

Control System Manuals

- Deep Sea Electronics DSE8610 MKII Controller Manual
- ComAp IntelliGen-NT-CB Paralleling Controller
- Woodward easYgen-3500 Operation Manual
- Deif AGC-4 Automatic Genset Controller
- Smartgen HGM9510 Controller Manual

Installation and Application Standards

- ISO 8528-9 Generator Installation Guidelines
- BS 7671 IET Wiring Regulations
- NFPA 110 Emergency and Standby Power Systems
- IEC 60364 Electrical Installations for Buildings
- Local Authority Building Regulations

Technical Application Guides

- Generator Sizing for Motor Starting
- Parallel Operation Design Guide
- Fuel System Installation Standards
- Ventilation and Cooling Design Guide
- Vibration Isolation and Mounting Guidelines

- Seismic and Wind Restraint Specifications

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