

# 1000kVA Generator Datasheet PDF - Complete Technical Specifications and Download Guide

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# 1000kVA Generator Datasheet PDF - Complete Technical Specifications and Download Guide

## Introduction

The 1000kVA generator represents a major industrial power generation installation, delivering substantial electrical output for large-scale facilities, critical infrastructure, and major industrial operations. This comprehensive datasheet provides complete technical specifications, performance characteristics, engineering data, and application guidance for 1000kVA (1MVA) diesel generator sets, serving as the definitive reference for consulting engineers, project managers, and facility operators responsible for major power system design and implementation.

Capable of delivering 800kW of prime power at 0.8 power factor, the 1000kVA generator addresses the power requirements of major hospitals, large manufacturing facilities, data centers, commercial complexes, and critical infrastructure. These substantial power generation units represent significant capital investment and require comprehensive engineering for installation, operation, and maintenance. The 1000kVA capacity provides megawatt-scale power capability, enabling complete facility backup or prime power for major operations.

Modern 1000kVA generators incorporate advanced technologies including high-efficiency emissions-compliant engines with sophisticated fuel management and after-treatment systems, premium alternators with advanced excitation systems, intelligent control systems with comprehensive monitoring and paralleling capability, and robust mechanical systems designed for reliable long-term operation in demanding applications. These technological capabilities enable compliance with stringent environmental regulations while delivering exceptional performance across diverse operating conditions and applications.

## Technical Specifications

### *Engine Specifications*

Parameter	Specification
Prime Power Output	1000 kVA / 800 kW
Standby Power Output	1100 kVA / 880 kW
Rated Voltage	400V / 230V (3-phase)
Rated Frequency	50 Hz
Rated Current (Prime)	1443.4 A
Power Factor	0.8 (lagging)
Engine Type	4-cycle, Turbocharged Intercooled Diesel
Number of Cylinders	12 or 16
Displacement	24.0L - 38.0L
Bore x Stroke	Varies by manufacturer
Compression Ratio	13.5:1 - 15.5:1
Aspiration	Sequential turbocharging with charge cooling
Governor Type	Electronic

| Governor Class | ISO 8528-5 Class G3 |

### ***Fuel System Specifications***

| Parameter | Specification |

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

| Fuel Consumption (100% Load) | 195-230 L/hr |

| Fuel Consumption (75% Load) | 150-180 L/hr |

| Fuel Consumption (50% Load) | 108-128 L/hr |

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

| Fuel Tank Capacity (Base) | 1000-1500 L |

| Fuel Tank Capacity (Optional) | Up to 6000 L |

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

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

### ***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 seconds |

| Starting Capability | 80% of rated kVA in one step |

| Alternator Cooling | Self-ventilated with external fan |

### ***Physical Specifications***

| Parameter | Specification |

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

| Length (Canopy) | 5000-6000 mm |

| Width (Canopy) | 2000-2400 mm |

| Height (Canopy) | 2200-2800 mm |

| Dry Weight (Canopy) | 10000-14000 kg |

| Operating Weight | 11500-16000 kg |

| Sound Level at 1m (Canopy) | 75-85 dB(A) |

| Sound Level at 7m (Canopy) | 65-75 dB(A) |

| Cooling System | Radiator with gear-driven fan |

| Coolant Capacity | 80-120 L |

### ***Environmental Specifications***

| Parameter | Specification |

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

| Operating Temperature Range | -25°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 characteristics of a 1000kVA generator demonstrate substantial fuel requirements commensurate with the megawatt-scale power output. At 25% load (250 kVA), consumption ranges from 72-85 liters per hour, representing approximately 35-38% of full-load consumption. This relatively high percentage at low loads reflects fixed engine overhead and auxiliary system demands inherent in large diesel engines.

As load increases to 50% (500 kVA), fuel consumption rises to approximately 108-128 L/hr. The most efficient operating region lies between 65-85% load, where specific fuel consumption reaches optimal values. At 75% load (750 kVA), consumption reaches 150-180 L/hr, representing efficient operation for the substantial power delivered. Full-load operation at 1000 kVA requires 195-230 L/hr depending on engine technology, ambient conditions, and fuel quality.

The fuel consumption curve emphasizes the importance of appropriate load matching for efficient operation. For installations with highly variable loads, consideration should be given to multiple paralleled generators that can be brought online progressively as load increases. This approach optimizes overall system efficiency and provides redundancy. Extended operation below 30% load should be avoided to prevent wet stacking and maintain engine health.

### ***Temperature Derating Curve***

High ambient temperatures significantly impact 1000kVA generator output capability through multiple mechanisms including reduced air density, decreased charge air cooler effectiveness, and reduced cooling capacity. Standard ratings apply at reference temperatures of 25°C or 40°C. Above 40°C ambient, derating factors of 1.5-2.5% per 5°C increment apply. At 50°C ambient, output may be limited to 90-95% of rated capacity.

The derating effects result from the interaction of reduced combustion efficiency due to lower air density, decreased charge air cooling effectiveness, reduced radiator heat rejection capability, and increased alternator temperature rise. Large high-power-density generators may experience more pronounced temperature sensitivity. Hot climate installations should consider oversizing, enhanced cooling systems, or reduced expectations for output capability.

### ***Altitude Derating Curve***

High altitude operation affects 1000kVA generators through reduced air density impacting both combustion and cooling system effectiveness. Standard ratings apply up to 1000 meters above sea level. Above this elevation, derating of 3-4% per 500 meters typically applies. At 2000 meters elevation, expect approximately 85-90% of rated capacity. At 3000 meters, output may drop to 75-82% of the sea-level rating.

Turbocharged engines with advanced charge cooling systems demonstrate improved altitude performance compared to simpler configurations. However, both engine combustion efficiency and cooling system capacity are affected by altitude-related air density reduction. For high-altitude installations, consult with the manufacturer for specific derating guidance and potential system modifications including enhanced cooling or reduced power expectations.

### ***Load Step Response Curve***

The load step response characteristics of a 1000kVA generator benefit from substantial rotating mass and sophisticated control systems. These units can typically accept 80% of rated load (800 kVA) in a single step while maintaining voltage deviation within  $\pm 10\%$  and frequency deviation within  $\pm 6\%$ . The high inertia of large rotating components provides excellent frequency stability during transient events.

Recovery to steady-state voltage typically occurs within 1.5-2 seconds, with frequency recovery within 2-3 seconds. The substantial capacity provides excellent motor starting capability, often eliminating the need for reduced voltage starting methods for large facility motors. Response characteristics vary based on engine technology, alternator design, and control system configuration.

## **Compatible Applications**

### ***Major Hospitals and Medical Centers***

1000kVA generators provide comprehensive backup power for major hospitals, medical centers, and healthcare complexes. These units support complete facility operations including life-safety systems, surgical suites, critical care areas, diagnostic imaging, laboratories, pharmaceutical storage, and all normal building loads. Healthcare applications require compliance with specific regulatory standards for reliability, testing, and maintenance.

### ***Large Industrial Facilities***

Major manufacturing plants, process industries, and industrial complexes rely on 1000kVA generators for production equipment, process controls, compressed air systems, material handling, environmental controls, and complete facility operations. The substantial capacity enables complete production continuity during utility outages rather than selective load support.

### ***Enterprise Data Centers***

Large data centers, colocation facilities, and cloud computing installations depend on 1000kVA generators for primary backup power. These applications require reliable power with fast response, automatic synchronization with UPS systems, N+1 or 2N redundancy configurations, and comprehensive monitoring. Generator availability directly impacts data center uptime guarantees and service level agreements.

### ***Major Commercial Complexes***

Large office complexes, shopping centers, hotels, entertainment venues, and mixed-use developments utilize 1000kVA generators for complete facility backup. The substantial capacity enables support for HVAC systems, elevators, lighting, security systems, IT infrastructure, and all normal operations without load shedding during utility transitions.

### ***Utility and Critical Infrastructure***

Power plants, substations, water treatment facilities, telecommunications facilities, and critical infrastructure installations require 1000kVA generators for essential backup power. These applications often require extended fuel storage, remote monitoring, automatic operation, and high reliability for unmanned facilities.

### ***Large Educational Institutions***

University campuses, research facilities, and large educational institutions utilize 1000kVA generators for academic buildings, research laboratories, computing facilities, dormitories, dining services, and safety systems. Multiple generators may be paralleled for campus-wide power distribution with redundancy.

## **Download PDF Section**

### ***Official Datasheet Downloads***

Complete technical datasheets for 1000kVA generators are available from manufacturer websites and authorized distributors. These comprehensive PDF documents contain detailed specifications, performance data, dimensional drawings, electrical schematics, installation requirements, and maintenance procedures. Documentation is essential for proper specification, installation, commissioning, and ongoing operation.

### ***Documentation Package Contents***

A complete 1000kVA generator documentation set includes:

- Comprehensive technical specification sheet
- Performance curves and operating characteristics
- Dimensional drawings with detailed dimensions
- Electrical schematics and wiring diagrams
- Control system documentation and manuals
- Foundation design requirements and drawings
- Fuel system installation specifications
- Ventilation and exhaust system requirements
- Vibration isolation and mounting details
- Detailed maintenance procedures and schedules
- Parts catalog with component specifications
- Installation and commissioning checklists
- Warranty documentation and registration forms

## ***Technical Support Resources***

Manufacturer technical support provides comprehensive assistance with:

- Application engineering and system design
- Detailed sizing calculations and analysis
- Installation supervision and commissioning
- Troubleshooting and diagnostic support
- Spare parts supply and logistics coordination
- Operator and technician training programs
- Software updates and configuration support
- Technical bulletins and service updates

## **Frequently Asked Questions**

1. What is the fuel consumption of a 1000kVA generator?

A 1000kVA generator consumes approximately 195-230 liters per hour at full load (1000 kVA / 800 kW). At 75% load, consumption drops to 150-180 L/hr. At 50% load, expect 108-128 L/hr. Actual consumption depends on engine technology, load profile, ambient conditions, and fuel quality.

2. What electrical infrastructure is required for a 1000kVA generator?

A 1000kVA generator requires substantial electrical infrastructure including switchgear rated 2000A-2500A, busways or multiple parallel cable runs, circuit breakers, automatic transfer equipment, and protection systems. The electrical installation must be designed by a qualified electrical engineer and comply with all applicable codes and standards.

3. What foundation does a 1000kVA generator require?

A 1000kVA generator requires a substantial reinforced concrete foundation with dimensions approximately 150-200% of the generator footprint, thickness of 500-600mm, and mass 1.5-2 times the generator weight (18,000-25,000 kg total). The foundation must be isolated from building structures, properly supported on suitable soil, and include vibration isolation provisions.

4. How much fuel storage do I need for a 1000kVA generator?

At full-load consumption of approximately 210 L/hr, a 15,000-liter fuel tank provides approximately 70 hours of operation. Required storage depends on utility reliability, fuel delivery logistics, regulatory requirements, and operational needs. Many facilities install bulk storage tanks with day tank systems for extended operation capability.

5. What maintenance does a 1000kVA generator require?

Maintenance includes daily inspections, weekly test runs, monthly battery and transfer switch tests, quarterly filter inspections, semi-annual comprehensive inspections, and annual major service including all fluids, filters, and detailed component inspection. Major services at specified intervals include valve adjustments, injector testing, and comprehensive system checks. Follow manufacturer-specific maintenance schedules.

6. Can 1000kVA generators be paralleled?

Yes, 1000kVA generators can be paralleled with identical or different capacity units using appropriate synchronizing controls, switchgear, and protection systems. Paralleling enables capacity expansion, load sharing, redundancy, and optimized operation. Multiple 1000kVA units can provide 2 MVA, 3 MVA, or higher total capacity with N+1 or 2N redundancy configurations.

#### 7. What emissions controls are required?

Stage V / Tier 4 Final compliant 1000kVA generators include diesel oxidation catalysts (DOC), diesel particulate filters (DPF) with active regeneration, and selective catalytic reduction (SCR) with DEF injection. These systems require regular maintenance, monitoring, DEF fluid supply, and occasional filter replacement to maintain emissions compliance and proper operation.

#### 8. How long does a 1000kVA generator last?

With proper maintenance, a 1000kVA generator can achieve 40,000-60,000 operating hours before major overhaul. In standby applications with limited running hours, service life typically ranges from 25-35 years. Maintenance quality, operating conditions, proper loading, and environmental factors significantly impact longevity.

#### 9. What is the difference between prime and standby ratings?

Prime-rated 1000kVA generators can operate continuously at variable loads with unlimited hours per year, accepting 10% overload for limited periods. Standby-rated units provide maximum output for limited hours (typically <200 hours/year) during utility outages with no overload capability. Prime-rated units feature more robust construction for extended operation and have higher capital cost.

#### 10. What size transfer switch do I need?

For a 1000kVA generator with 1443A rated current, a 1600A or 2000A automatic transfer switch is typically required. The ATS must be rated for the application class (emergency, legally required, optional standby) and comply with applicable standards. Multiple ATS units are often used to serve different load categories with different priority levels.

#### 11. How do I transport a 1000kVA generator?

1000kVA generators weighing 12,000-16,000 kg require heavy haul transport with appropriate permits, route planning, and specialized equipment. Standard shipping containers cannot accommodate these units; specialized flatbed trailers or low-loaders with crane loading are required. Transportation planning should consider route restrictions, bridge weights, permit requirements, and site access.

#### 12. What ventilation does a 1000kVA generator need?

A 1000kVA generator requires substantial ventilation for combustion air, cooling air, and heat rejection. Minimum ventilation rates typically range from 6-9 m<sup>3</sup>/s depending on ambient conditions and installation configuration. Proper ventilation design prevents overheating, ensures adequate combustion air, and maintains acceptable operating temperatures.

#### 13. What testing is required for standby generators?

Standby generators should be tested weekly (no-load) and monthly (with load) per NFPA 110 requirements. Load bank testing should be performed at least annually to verify full-load capability. Healthcare facilities have specific testing requirements per CMS regulations. Transfer switch testing, battery testing, and fuel system testing are also required components of a comprehensive testing program.

#### 14. What control system features are available?

Modern 1000kVA generators offer sophisticated control systems including automatic start/stop, synchronizing and load sharing for parallel operation, comprehensive protection functions, remote monitoring via Ethernet or cellular, data logging and trending, integration with building management systems, and advanced diagnostic capabilities. Control system selection should match specific application requirements.

15. What are the installation timeline and major requirements?

Complete installation of a 1000kVA generator including foundation, electrical systems, fuel systems, exhaust systems, and commissioning typically requires 12-20 weeks depending on site conditions, permitting, and complexity. Planning should begin 6-12 months in advance. Major milestones include engineering design, permitting, foundation construction, equipment delivery, mechanical and electrical installation, and commissioning.

## Related Downloads

### ***Engine Technical Documentation***

- Cummins QSK38-G5 Engine Specifications
- Perkins 4012-46TWG3A Technical Manual
- Volvo Penta TAD1654GE Engine Datasheet
- MTU Series 4000 Engine Manual
- Mitsubishi S16R-Y1PTA Engine Specifications

### ***Alternator Documentation***

- Stamford UCDI274L Alternator Datasheet
- Leroy Somer LSA54.1 Technical Manual
- Mecc Alte ECO58-2LN/4 Specifications
- Marathon Electric 844 Datasheet
- Siemens 1FC6 Series Technical Data

### ***Control System Manuals***

- Deep Sea Electronics DSE8860 MKII Controller
- ComAp IntelliGen-NT-CB Paralleling System
- Woodward easYgen-3200XT Operation Manual
- Deif AGC-4 Automatic Genset Controller
- Smartgen HGM9510 Controller Manual

### ***Installation Standards***

- ISO 8528-9:2017 Generator Installation
- BS 7671 IET Wiring Regulations
- NFPA 110 Emergency Power Systems

- IEC 60364 Electrical Installations
- Local Building and Fire Codes

### ***Application Engineering Guides***

- Generator Sizing Methodology
- UPS System Compatibility Guide
- Paralleling System Design
- Fuel System Engineering
- Ventilation Design Manual
- Seismic and Wind Restraint
- Sound Attenuation Design
- Vibration Isolation Guidelines

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