Volvo Engine Technical Datasheet PDF - Complete Specifications and Application Guide

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Introduction

Volvo Penta engines represent the pinnacle of Scandinavian engineering excellence, delivering outstanding reliability, exceptional fuel efficiency, and superior performance for power generation applications worldwide. This comprehensive technical datasheet provides detailed specifications, performance characteristics, and application guidance for Volvo engines used in generator sets, serving as the authoritative reference for engineers, specifiers, and maintenance professionals.

Volvo Penta's heritage in engine manufacturing spans over 100 years, with a reputation built on innovative engineering, environmental responsibility, and unwavering quality. The company offers a comprehensive range of diesel engines for power generation from 60 kVA to over 1000 kVA, serving applications from small commercial backup systems to large industrial power plants. Volvo engines are particularly renowned for their excellent fuel efficiency, low emissions, and compact design.

Modern Volvo generator engines incorporate cutting-edge technologies including advanced common rail fuel injection, sophisticated electronic engine management, advanced turbocharging with charge air cooling, and comprehensive emissions after-treatment systems. These technologies enable Volvo engines to meet the most stringent global emissions standards while delivering outstanding performance, reliability, and operational economy across diverse applications and operating conditions.

Technical Specifications

Small Capacity Engines (60-150 kVA Applications)

Parameter	TAD531GE	TAD731GE	TAD751GE
Configuration	4-cylinder in-line	4-cylinder in-line	4-cylinder in-line
Displacement	4.8 L	7.1 L	7.1 L
Bore x Stroke	103mm x 144mm	108mm x 130mm	108mm x 130mm
Aspiration	Turbocharged aftercooled	Turbocharged aftercooled	Turbocharged aftercooled
Fuel System	Common Rail	Common Rail	Common Rail
Prime Power Range	48-65 kW	70-90 kW	85-115 kW
Standby Power Range	53-72 kW	77-99 kW	94-127 kW
Governor Type	Electronic	Electronic	Electronic
Rated Speed	1500 RPM	1500 RPM	1500 RPM

Medium Capacity Engines (150-300 kVA Applications)

Parameter	TAD851GE	TAD941GE	TAD1351GE

Configuration	4-cylinder in-line	5-cylinder in-line	6-cylinder in-line
Displacement	8.1 L	9.4 L	13.1 L
Bore x Stroke	110mm x 135mm	110mm x 135mm	130mm x 140mm
Aspiration	Turbocharged aftercooled	Turbocharged aftercooled	Turbocharged aftercooled
Fuel System	Common Rail	Common Rail	Common Rail
Prime Power Range	120-160 kW	170-215 kW	230-300 kW
Standby Power Range	132-176 kW	187-237 kW	253-330 kW
Governor Type	Electronic	Electronic	Electronic
Rated Speed	1500 RPM	1500 RPM	1500 RPM

Large Capacity Engines (300-500 kVA Applications)

Parameter	TAD1352GE	TAD1353GE	TAD1651GE
Configuration	6-cylinder in-line	6-cylinder in-line	6-cylinder in-line
Displacement	13.1 L	13.1 L	16.1 L
Bore x Stroke	130mm x 150mm	130mm x 150mm	144mm x 165mm
Aspiration	Turbocharged aftercooled	Turbocharged aftercooled	Turbocharged aftercooled
Fuel System	Common Rail	Common Rail	Common Rail
Prime Power Range	270-350 kW	320-400 kW	380-480 kW
Standby Power Range	297-385 kW	352-440 kW	418-528 kW
Governor Type	Electronic	Electronic	Electronic
Rated Speed	1500 RPM	1500 RPM	1500 RPM

High Capacity Engines (500-1000 kVA Applications)

Parameter	TAD1652GE	TAD1653GE	TAD1654GE
Configuration	6-cylinder in-line	6-cylinder in-line	6-cylinder in-line
Displacement	16.1 L	16.1 L	16.1 L
Bore x Stroke	144mm x 165mm	144mm x 165mm	144mm x 165mm
Aspiration	Sequential turbocharged intercooled	Sequential turbocharged intercooled	Sequential turbocharged intercooled
Fuel System	Common Rail	Common Rail	Common Rail
Prime Power Range	450-550 kW	520-650 kW	600-750 kW
Standby Power Range	495-605 kW	572-715 kW	660-825 kW
Governor Type	Electronic	Electronic	Electronic
Rated Speed	1500 RPM	1500 RPM	1500 RPM

Fuel System Specifications

High-Pressure Common Rail System

Parameter	Specification
Injection Type	Common Rail Direct Injection
Maximum Injection Pressure	Up to 2400 bar
Injection Timing	Electronically controlled, multiple injection events
Governor Response	Isochronous electronic
Fuel Filters	Dual-stage with water separator
Fuel Priming	Integrated electric priming pump
Fuel Type	ASTM D975 No. 2-D Diesel
Biodiesel Capability	B5 standard, B20 with specific models

Fuel Consumption Data (Typical Values at Prime Rating)

Engine Model	Full Load (L/hr)	75% Load (L/hr)	50% Load (L/hr)
TAD531GE (55 kW)	15-17	11-13	8-9
TAD731GE (80 kW)	22-25	17-19	12-14
TAD851GE (140 kW)	38-42	29-32	21-24
TAD941GE (190 kW)	52-57	40-44	28-32
TAD1352GE (310 kW)	84-92	64-71	46-51
TAD1653GE (580 kW)	155-170	118-130	84-93

Emissions Control Systems

Stage V / Tier 4 Final After-treatment

Component	Function	Maintenance Interval
Diesel Oxidation Catalyst (DOC)	Converts CO and HC to CO2 and H2O	Inspection: 1000 hrs; service: 3000-5000 hrs
Diesel Particulate Filter (DPF)	Captures and oxidizes particulates	Active regeneration; cleaning: 3000-5000 hrs
Selective Catalytic Reduction (SCR)	Reduces NOx using DEF	DEF dosing: continuous
DEF Injection System	Precisely doses DEF into exhaust	Filter: 2000-3000 hrs
Ammonia Slip Catalyst (ASC)	Prevents ammonia emissions	Integrated with SCR system

DEF System Specifications

Parameter	Specification
DEF Standard	ISO 22241-1 / AUS 32
Urea Concentration	32.5% in deionized water
Consumption Rate	3-7% of fuel consumption
Operating Temperature	-11°C to +50°C (with heater)
Storage Requirements	Cool, shaded location
Tank Materials	HDPE, stainless steel, titanium

Electronic Control System

EMS 2 / EEM 4 Control System Features

Feature	Description
Governor Type	Isochronous electronic governor
Speed Regulation	±0.25% steady-state
Fuel Strategy	Adaptive fuel mapping for optimal efficiency
Diagnostics	Real-time monitoring with fault logging
Communication	J1939 CAN bus, Modbus RTU capability
Protection	Comprehensive engine protection system
Remote Interface	Compatible with major generator controllers
Data Logging	Operational parameters and fault history

Engine Protection Settings

Parameter	Warning Level	Shutdown Level
Low Oil Pressure	1.8-2.5 bar	1.2-2.0 bar
High Coolant Temperature	102-105°C	108-112°C
Overspeed	-	110-115% rated speed
Low Coolant Level	-	Sensor activated
High Oil Temperature	120-125°C	130-135°C
Low Fuel Pressure	2.0-2.5 bar	1.5-2.0 bar
High Exhaust Temperature	Model specific	Model specific

Performance Curves Description

Power and Torque Characteristics

Volvo generator engines are engineered with power curves optimized specifically for generator drive applications. Unlike automotive engines with peak torque at specific RPM, generator engines deliver essentially constant torque across the operating range, ensuring excellent load acceptance and frequency stability. The linear power delivery provides predictable performance under all load conditions.

Fuel Efficiency Optimization

Volvo engines are renowned for excellent fuel efficiency across the entire operating range. The common rail fuel injection system enables precise control of injection timing, duration, and pressure, optimizing combustion efficiency. Best specific fuel consumption typically occurs at 70-85% load. The electronic control system continuously adapts injection parameters to maintain optimal efficiency under varying conditions.

Transient Response Performance

Volvo engines with electronic governing and high-pressure common rail injection deliver outstanding transient response for generator applications. Load step acceptance of 60-80% of rated load in a single step is typical. The fast-acting fuel system and sophisticated governor control enable recovery to rated speed within 1.5-3 seconds after sudden load application, ensuring excellent frequency stability.

Compatible Applications

Standby Power Systems

Volvo engines are extensively specified for standby generator applications requiring reliable backup power for hospitals, data centers, telecommunications facilities, commercial buildings, and critical infrastructure. The proven reliability, rapid starting capability, and excellent transient response ensure dependable power during utility outages. Volvo's reputation for quality makes these engines preferred for mission-critical applications.

Prime Power Generation

Volvo engines excel in prime power applications including remote installations, construction sites, mining operations, and facilities without reliable utility power. The excellent fuel efficiency, robust construction, and extended service intervals make Volvo ideal for continuous duty applications. Prime power ratings permit unlimited operating hours with appropriate maintenance.

Marine Generator Applications

Volvo Penta offers marinized versions of generator engines for shipboard power generation. Marine engines feature special cooling systems, corrosion-protected components, and marine-grade materials. Classification society approvals include ABS, BV, DNV-GL, LR, and RINA. Volvo's marine heritage ensures exceptional reliability in demanding marine environments.

Industrial and Rental Applications

Volvo engines power industrial generators and rental fleets worldwide. The excellent power-to-weight ratio, reliable starting, fuel efficiency, and global service network make Volvo preferred for rental and industrial applications where performance and reliability are paramount. Compact design enables installation in space-constrained applications.

Download PDF Section

Official Volvo Penta Documentation

Complete technical documentation for Volvo generator engines is available through Volvo Penta distributors and the Volvo Penta website. Documentation includes engine specifications, installation drawings, operation manuals, and parts catalogs for all current production engines.

Documentation Package Contents

- Engine Technical Specification Sheets
- Performance Curve Documents
- Installation Guidelines and Drawings
- Operation and Maintenance Manuals
- Parts Catalogs and Service Manuals
- Service Bulletins and Updates
- Emissions Compliance Documentation
- Application Engineering Guides

Frequently Asked Questions

1. What is the expected service life of a Volvo generator engine?

With proper maintenance, Volvo generator engines typically achieve 25,000-40,000 operating hours before major overhaul depending on engine series and application. In standby applications with limited running hours, service life can exceed 25-30 years. Volvo's robust engineering ensures exceptional longevity with proper care.

2. What are the recommended oil change intervals?

Standard oil change intervals for Volvo generator engines are typically 250-500 hours depending on engine model and application. Low-load operation, dusty environments, or biodiesel fuel may require more frequent changes. Follow the specific maintenance schedule for your engine model and operating conditions.

3. What distinguishes prime from standby ratings?

Prime power rating allows unlimited operating hours at variable loads up to rated output, with average load factor not exceeding 70%. A 10% overload capability is available for limited periods. Standby rating applies to emergency backup applications with operating hours typically limited to 200 hours per year at rated output with no overload capability.

4. What fuel specifications should I use?

Volvo engines are designed for ASTM D975 No. 2-D diesel fuel. Standard models are approved for B5 biodiesel blends. Some models with specific configuration can operate on B20. For cold weather operation, winter-blend fuel or additives prevent fuel gelling. Follow fuel specifications in the operation manual.

5. What emissions standards do Volvo engines meet?

Current production Volvo generator engines meet EU Stage V and EPA Tier 4 Final emissions standards. After-treatment systems include DOC, DPF, and SCR with DEF injection. Earlier engine models meet previous emissions tiers. Volvo is committed to meeting future emissions requirements as regulations evolve.

6. Can Volvo engines operate at low loads?

Extended operation below 30% load should be avoided to prevent wet stacking, carbon accumulation, and reduced engine efficiency. If low-load operation is unavoidable, periodic load bank operation helps maintain engine health. Volvo offers specific guidance for low-load operation when required by application.

7. What warranty is provided for Volvo generator engines?

Warranty terms vary by engine model, application, and region. Standard warranty typically includes 1-2 years or 1000-2000 hours. Extended warranty and service agreements are available through Volvo Penta distributors. Consult your local distributor for specific warranty terms and extended coverage options.

8. How do I correctly size a Volvo engine for my application?

Generator sizing requires analysis of connected loads, motor starting requirements, load characteristics, and environmental factors. Volvo Penta provides application engineering support and sizing tools. Consult a qualified engineer or contact your Volvo Penta distributor for accurate sizing recommendations.

9. What after-treatment maintenance is required?

After-treatment maintenance includes DPF inspection and cleaning at 3000-5000 hour intervals, DEF filter changes every 2000-3000 hours, and system monitoring. DEF consumption at 3-7% of fuel consumption requires regular tank refilling. Follow the maintenance schedule specific to your engine model.

10. Can Volvo diesel engines be converted to gas?

Volvo Penta offers dedicated gas engines for generator applications. Conversion of diesel engines to natural gas operation is not supported. Gas engines feature specific components, compression ratios, and control systems engineered for gaseous fuel operation.

11. What is DEF and how is it used?

DEF (Diesel Exhaust Fluid) is a 32.5% urea solution in deionized water used in SCR systems to reduce NOx emissions. DEF is stored in a dedicated tank and injected into the exhaust system where it reacts with NOx in the catalyst. DEF is required to meet Stage V / Tier 4 Final emissions standards.

12. Where can I obtain genuine Volvo parts?

Genuine Volvo Penta parts are available through the worldwide network of authorized Volvo Penta dealers. Parts can be identified using the engine serial number and electronic parts catalog. Genuine parts ensure proper fit, function, and warranty compliance.

13. What coolant specifications apply?

Volvo Penta recommends using coolant meeting specific requirements detailed in the operation manual. Use properly formulated heavy-duty diesel engine coolant with appropriate additives. Extended-life coolants are

available for reduced maintenance requirements.

14. What diagnostic capabilities are available?

Volvo Penta offers the VCADS Pro diagnostic tool for comprehensive engine diagnostics, parameter adjustment, and fault analysis. The diagnostic system connects via the J1939 data link. Contact your Volvo Penta dealer for diagnostic tool availability and training.

15. What technical support does Volvo Penta provide?

Volvo Penta provides comprehensive support including application engineering, installation guidance, commissioning assistance, operator and technician training, and technical support through the global dealer network. Service agreements, extended warranty programs, and preventive maintenance contracts are available.

Related Downloads

Engine Documentation

- Volvo Penta TAD530-550 Series Operation Manual
- Volvo Penta TAD730-750 Series Technical Manual
- Volvo Penta TAD850 Series Service Manual
- Volvo Penta TAD940 Series Parts Catalog
- Volvo Penta TAD1350 Series Installation Guide
- Volvo Penta TAD1650 Series Technical Manual

Emissions Documentation

- Stage V After-treatment System Overview
- Tier 4 Final Compliance Guide
- DEF Handling and Storage Manual
- DPF Regeneration Guidelines
- Emissions System Maintenance

Application Guides

- Generator Sizing Guidelines
- Installation Standards
- Cooling System Design
- Fuel System Installation
- Ventilation Requirements
- Mounting Specifications

Control System Documentation

- EMS 2 Control System Manual
- EEM 4 Control System Manual
- J1939 Communication Protocol
- Diagnostic Software Guide
- Controller Integration Documentation

Service Documentation

- Preventive Maintenance Schedules
- Oil Analysis Guidelines
- Coolant System Maintenance
- Filter Specifications
- Service Tool Requirements

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