Wabtec
CORPORATION

Engine Selection Guide

MARINE POWER GEN INDUSTRIAL

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The Future of Transportation

> “Our position as a global transportation leader gives us a unique perspective on the megatrends that are impacting our customers and other stakeholders, namely: climate change, automation and digitization, and urbanization.”

-Rafael Santana
Wabtec’s President & CEO

For more than 50 years, Wabtec Corporation has designed and built high-performance diesel engines for the locomotive, marine and stationary power generation industries. Our world-class engine manufacturing facilities in Pennsylvania rank among the largest in the world for medium-speed engines.

Wabtec’s portfolio for marine & stationary power markets include:

- Diesel Engines
- Onshore Power Supply
- Extruded Rubber Marine Fenders
- High torque AC/DC motors
- Engine cooling components

Visit our website for more information:
WabtecCorp.com

We Are Wabtec.

Alternative Fuels

At Wabtec, we have a longstanding commitment to tackling the world's biggest transportation challenges. Today, clean energy and sustainable transportation are top of mind with marine and power-generation customers wanting to drastically reduce fuel consumption and greenhouse gas emissions, cut down pollutants, and eliminate waste. Wabtec is constantly exploring current and future fuel sources and power technologies so that the cleanest and most commercially viable options are developed to meet our customer's future power needs. Renewable diesel, biodiesel, hydrogen, methanol, ammonia, and gas-to-liquid synthetic fuels are among the options being evaluated for future development programs.

CyberSafety Type Approval

All of Wabtec's diesel engines and aftermarket components are manufactured at our Grove City, Pennsylvania facilities, each of which are certified by **American Bureau of Shipping (ABS)** with **Product Quality Assurance (PQA)** class approval. As a prerequisite for this important PQA class approval, these facilities also passed Manufacturer Assessment (MA) as well as Product Design Assessment (PDA). Most recently, we have received **ABS CyberSafety ® Type Approval** for our US EPA Tier 4 / IMO III Engine Control System. This certification helps to mitigate risks and vulnerabilities generated by increasing levels of connectivity and reliance on more digitally-enabled systems in the maritime supply chain.

Marine

250MDC EPA Tier 4/IMO Tier III

The 250MDC EPA Tier 4/IMO III emissions compliant engine is the most technologically advanced and fuel-efficient medium speed diesel engine ever built by Wabtec Corporation. The 250MDC marine diesel engines meet EPA Tier 4 and IMO III emissions standards with advanced exhaust gas recirculation that requires no urea-based aftertreatment. This advanced technology limits the formation of NO_x in cylinder as opposed to removing NO_x from the exhaust through an aftertreatment system, while maintaining world class fuel efficiency.

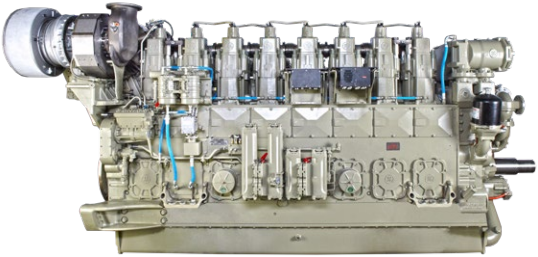
250MDC EPA Tier 4/IMO Tier III

Key Benefits

- Eliminates the need for an SCR system and urea storage tanks, preserving valuable cargo and accommodation capacity - **up to 40% less space and up to 50% less weight**
- No additional logistics and operating expenses for urea replenishment and handling - **up to 10% operating cost savings**
- Reduces ship-design complexity and shipyard installation time and cost compared to an engine with an SCR aftertreatment solution - **up to 50% less installation cost**
- Robust and proven design, simple to operate
- World-class fuel efficiency and load response with practically no visible smoke
- High engine energy efficiency with more heat recovery available in jacket water system from EGR
- Narrow footprint allows ease of maintenance and packaging advantage
- 100% power take off (PTO) from either end of the engine
- Low vibration and noise generation

250MDC EPA Tier 4/IMO Tier III

EPA Tier 4 vs. IMO Tier III Marine Diesel Engines



The Wabtec MDC engine can be delivered as dual certified: the U.S. EPA (Environmental Protection Agency) Tier 4 and IMO (International Maritime Organization) Tier III. This allows for one engine line to meet either or both emission certifications. However, there is a significant difference between these standards. The EPA Tier 4 emission standards require the limit of additional pollutants, such as Carbon Monoxide (CO), Hydrocarbon (HC), or Particulate Matter (PM) (representing 100s of metric tons of pollutant reductions per vessel per year). Please refer to the table on the next page for additional details. Therefore, in IMO Tier III regulated regions of the world, the Wabtec MDC engines will operate with significantly less pollutants than the standards, making this engine line extremely clean.

Norm	Engine Category	CO g/kWh	HC g/kWh	NO_x g/kWh	HC+NO_x g/kWh	PM g/kWh	PN g/kWh	A
EU IIIA	SV≥5 5≤ SV <15 15≤ SV <20 & P≤ 3300 kW 15≤ SV <30	5.0	n/a	n/a	7.2 - 9.8 7.2 8.7 9.8	.05	n/a	n/a
IMO II	P > 130 kW n<130 130≤n<2000 n≥2000	5.0	n/a	7.7 - 14.4 = 14.4 =44 $n^{(-0.23)}$ = 7.7	n/a	n/a	n/a	n/a
IMO III	P > 130 kW n<130 130≤n<2000 n≥2000	n/a	n/a	2 - 3.4 = 3.4 = 9 $n^{(-0.2)}$ =2	n/a	n/a	n/a	n/a
EPA 4	600 ≤ P < 2000 2000 ≤ P < 3700 P ≥ 3700 Class 3: SV ≥ 30 l	5.0	0.19 0.19 0.19 2.0	1.8 1.8 1.8 Per IMO III	n/a	0.04 0.04 0.06 n/a	n/a	n/a
EU V	P ≥ 1000	3.5	0.19	0.4	n/a	0.01	1 x10^{12}	6

L250MDC EPA Tier 4/IMO Tier III

Engine Specifications

	8L250MDC	6L250MDC
Number of cylinders	8	6
Stroke cycle	4	4
Cylinder arrangement	inline	inline
Bore	250 mm (9.8 in)	250 mm (9.8 in)
Stroke	320 mm (12.6 in)	320 mm (12.6 in)
Compression ratio	15.0:1	15.0:1
Height w/ deep sump	2,785 mm (109.6 in)	2,785 mm (109.6 in)
Length	5,875 mm (231 in)	4,880 mm (192 in)
Width	2,087 mm (82 in)	1,995 mm (78.5 in)
Crankshaft center line marine sump	940 mm (37 in)	940 mm (37 in)
Crankshaft center line to mounting feet	308 mm (12.1 in)	308 mm (12.1 in)
Exhaust diameter	260 mm (10.2 in)	260 mm (10.2 in)
Dry weight w/flywheel	24,766 kg (54,600 lbs)	21,137 kg (46,600 lbs)

Engine dimensions and weights provided are approximate
For detailed dimensions and weights reference application drawings

L250MDC EPA Tier 4/IMO Tier III

MCR Engine Ratings

Rated speed	bkW	bhp	Hz	kWe (96% eff.)
8L250MDC				
1000	2,500	3,353	50	2,400
900	2,250	3,018	60	2,160
6L250MDC				
1000	1,900	2,548	50	1,824
900	1,700	2,280	60	1,632

Maximum continuous rating (MCR) Maximum speed and load conditions at which the engine is capable of operating continuously for an unlimited number of hours per year.

Recommended Match Points

Application types	Rated speed	Rpm	*8L250MDC*		*6L250MDC*	
			900	**1000**	**900**	**1000**
FPP	**Propeller Match Power**	bkW	2,025	2,250	1,530	1,710
		bhp	2,716	3,017	2,052	2,294
FPP-HT		bkW	1,913	2,125	1,145	1,615
		bhp	2,565	2,850	1,938	2,166
CPP/EPP-VS		bkW	2,250	2,500	1,700	1,900
		bhp	3,018	3,353	2,280	2,548
CPP/EPP-CS		bkW	2,250	2,500	1,700	1,900
		bhp	3,018	3,353	2,280	2,548

FPP = Fixed pitch propeller
FPP-HT = Fixed pitch propeller – high torque
CPP/EPP-VS = Variable speed CPP or gen set
CPP/EPP-CS = Constant speed CPP or gen set

Expanded definitions can be found on page 33

L250MDC EPA Tier 4/IMO Tier III

Genset Specifications

	8L250MDC	*6L250MDC*
Length	8,000 - 8,992 mm (315 - 354 in)	7,400 - 8,534 mm (291.3 - 336 in)
Width	2,370 - 2,400 mm (93.3 - 94.5 in)	2,372 - 2,400 mm (93.4 - 94.5 in)
Height	3,212 - 3,724 mm (126.5 - 146.6 in)	3,212 - 3,700 mm (126.5 - 145.7 in)
Dry Weights		
Baseframe	7,500 - 12,032 kg (16,535 - 26,526 lbs)	6,700 - 11,848 kg (14,771 - 26,120 lbs)
Alternator	9,500 - 13,500 kg (20,944 - 29,762 lbs)	8,486 - 13,536 kg (18,708 - 29,842 lbs)
Coupling	621 - 1,500 kg (1,369 - 3,307 lbs)	610 - 1,500 kg (1,345 - 3,307 lbs)
Engine	24,766 kg (54,600 lbs)	21,137 kg (46,600 lbs)
Total	43,266 - 50,919 kg (95,385 - 112,257 lbs)	37,823 - 47,131 kg (83,385 - 103,906 lbs)

Weights and dimensions depend on configuration
For marine genset ratings please refer to the marine engine rating tables

V250MDC EPA Tier 4/IMO Tier III

Engine Specifications

	16V250MDC	*12V250MDC*
Number of cylinders	16	12
Stroke cycle	4	4
Cylinder arrangement	V	V
Bore	250 mm (9.8 in)	250 mm (9.8 in)
Stroke	320 mm (12.6 in)	320 mm (12.6 in)
Compression ratio	15.0:1	15.0:1
Height*	3,721 mm (147 in)	3,636 mm (143 in)
Length	6,285 mm (247 in)	5,209 mm (205 in)
Width	2,778 mm (109.4 in)	2,730 mm (107 in)
Crankshaft center line marine sump	1,161 mm (45.8 in)	1,077 mm (42.4 in)
Crankshaft center line to mounting feet	536 mm (21.1 in)	536 mm (21.1 in)
Exhaust diameter	610 mm (24 in)	610 mm (24 in)
Dry weight	34,350 kg (75,728 lbs)	28,667 kg (63,200 lbs)

*includes the exhaust stack and bellows

Engine dimensions and weights provided are approximate
For detailed dimensions and weights reference application drawings

V250MDC EPA Tier 4/IMO Tier III

MCR Engine Ratings

Rated speed	bkW	bhp	Hz	kWe (96% eff.)
16V250MDC				
1000	4,700	6,303	50	4,512
900	4,200	5,632	60	4,032
12V250MDC				
1000	3,500	4,693	50	3,360
900	3,150	4,225	60	3,024

Maximum continuous rating (MCR) Maximum speed and load conditions at which the engine is capable of operating continuously for an unlimited number of hours per year

Recommended Match Points

Application types	Rated speed	Rpm	*16V250MDC*		*12V250MDC*	
			900	**1000**	**900**	**1000**
FPP	**Propeller Match Power**	bkW	3,780	4,230	2,835	3,150
		bhp	5,069	5,673	3,802	4,224
FPP-HT		bkW	3,570	3,995	2,678	2,975
		bhp	4,787	5,358	3,591	3,989
CPP/EPP-VS		bkW	4,200	4,700	3,150	3,500
		bhp	5,632	6,303	4,225	4,693
CPP/EPP-CS		bkW	4,200	4,700	3,150	3,500
		bhp	5,632	6,303	4,225	4,693

FPP = Fixed pitch propeller
FPP-HT = Fixed pitch propeller – high torque
CPP/EPP-VS = Variable speed CPP or gen set
CPP/EPP-CS = Constant speed CPP or gen set

Expanded definitions can be found on page 33

V250MDC EPA Tier 4/IMO Tier III

Genset Specifications

	16V250MDC	*12V250MDC*
Length	9,200 - 10,203 mm (362.2 - 401.7 in)	8,000 - 9,352 mm (315 - 368.2 in)
Width	2,700 - 2,779 mm (106.3 - 109.4 in)	2,700 - 2,730 mm (106.3 - 107.5 in)
Height	3,420 - 4,300 mm (134.6 - 169.3 in)	3,420 - 4,336 mm (134.6 - 170.7 in)
Dry Weights		
Baseframe	8,900 - 12,500 kg (19,621 - 27,558 lbs)	7,700 - 12,875 kg (16,976 - 28,386 lbs)
Alternator	16,000 - 23,000 kg (35,274 - 50,706 lbs)	13,000 - 17,421 kg (26,660 - 38,407 lbs)
Coupling	683 - 1,800 kg (1,506 - 3,968 lbs)	683 - 1,600 kg (1,506 - 3,526 lbs)
Engine	34,350 kg (75,728 lbs)	28,667 kg (63,200 lbs)
Total	61,050 - 70,533 kg (134,592 - 155,499 lbs)	50,857 - 59,647 kg (112,121 - 131,498 lbs)

Weights and dimensions depend on configuration
For marine genset ratings please refer to the marine engine rating tables

250MDA/MDB IMO Tier II

The 250MDA/MDB IMO II emissions compliant marine engine series includes both inline and V models and delivers a continuous power range from 1,498 bkW to 4,239 bkW (2,009 bhp to 5,685 bhp). The engines are based on a rugged one-piece iron casting mainframe for excellent vibration dampening characteristics and long-term stability to minimize bore distortion. Our easy to service unitized cylinder assembly concept enables quick change outs for increased engine uptime.

250MDA/MDB IMO Tier II

Key Benefits

- Durable engine design to support extended maintenance and overhaul intervals
- Easy to service through large doors on mainframe to access crankcase; camshafts that are arranged in individual sections; a sectional exhaust manifold and a unitized cylinder assembly concept
- Reliable engines with rugged construction and quality assured parts
- Fuel efficient through a high capacity turbocharger, electronic fuel injection and efficient combustion management by our EC2+ engine controller
- Fuel and lube-oil consumption among the lowest in the industry

L250 IMO Tier II

Engine Specifications

	8L250MDA	*6L250MDA*
Number of cylinders	8	6
Stroke cycle	4	4
Cylinder arrangement	inline	inline
Bore	250 mm (9.8 in)	250 mm (9.8 in)
Stroke	320 mm (12.6 in)	320 mm (12.6 in)
Compression ratio	16.8:1	16.8:1
Height w/ deep sump	2,962 mm (116 in)	2,962 mm (116 in)
Length	5,949 mm (234 in)	5,138 mm (202 in)
Width	1,950 mm (77 in)	1,950 mm (77 in)
Crankshaft center line marine sump	940 mm (37 in)	940 mm (37 in)
Crankshaft center line to mounting feet	308 mm (12.1 in)	308 mm (12.1 in)
Exhaust diameter	457 mm (18 in)	457 mm (18 in)
Dry weight	20,856 kg (45,980 lbs)	17,295 kg (38,129 lbs)

Engine dimensions and weights provided are approximate
For detailed dimensions and weights reference application drawings

L250 IMO Tier II

Engine Ratings

Rated speed	bkW		bhp		Hz
	MCR	Overload	MCR	Overload	
8L250MDA					
1050	2,330	2,564	3,125	3,438	NA
1000	2,219	2,441	2,976	3,274	50
900	1,998	2,198	2,679	2,947	60
6L250MDA					
1050	1,748	1,922	2,344	2,578	NA
1000	1,664	1,831	2,232	2,455	50
900	1,498	1,648	2,009	2,210	60

Maximum continuous rating (MCR) Maximum speed and load conditions at which the engine is capable of operating continuously for an unlimited number of hours per year.

Overload Power is power which an engine may be permitted to deliver, with a duration and frequency of use depending on the service application, at stated ambient conditions, immediately after operating at the continuous power restricted to 1 hour in a 12 hour time span.

V250 IMO Tier II

Engine Specifications

	16V250MDB	*12V250MDB*
Number of cylinders	16	12
Stroke cycle	4	4
Cylinder arrangement	V	V
Bore	250 mm (9.8 in)	250 mm (9.8 in)
Stroke	320 mm (12.6 in)	320 mm (12.6 in)
Compression ratio	16.8:1	16.8:1
Height	3,275 mm (129 in)	3,190 mm (126 in)
Length	5,684 mm (224 in)	4,808 mm (189 in)
Width	2,468 mm (97 in)	2,468 mm (97 in)
Crankshaft center line marine sump	1,162 mm (46 in)	1,077 mm (42 in)
Crankshaft center line to mounting feet	536 mm (21 in)	536 mm (21 in)
Exhaust diameter	610 mm (24 in)	610 mm (24 in)
Dry weight	30,844 kg (68,000 lbs)	23,400 kg (51,600 lbs)

Engine dimensions and weights provided are approximate and based on B-series
For detailed dimensions and weights reference application drawings

V250 IMO Tier II

Engine Ratings

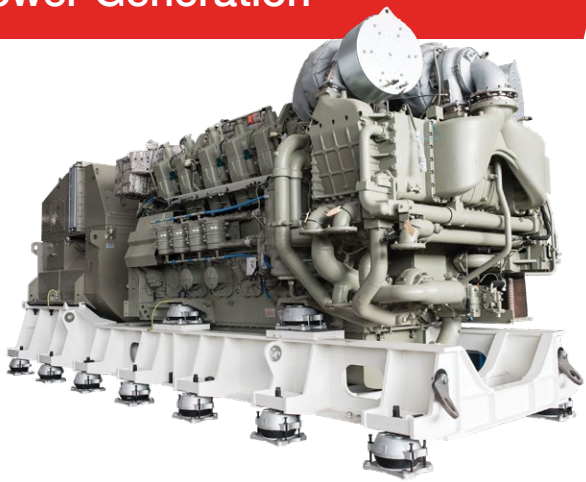
Rated speed	bkW		bhp		Hz
	MCR	Overload	MCR	Overload	
16V250MDB					
1050	4,239	4,664	5,685	6,254	NA
1000	4,038	4,442	5,415	5,957	50
900	3,632	3,995	4,870	5,357	60
12V250MDB					
1050	3,180	3,499	4,265	4,692	NA
1000	3,028	3,330	4,060	4,466	50
900	2,726	2,998	3,655	4,021	60

Maximum continuous rating (MCR) Maximum speed and load conditions at which the engine is capable of operating continuously for an unlimited number of hours per year.

Overload Power is power which an engine may be permitted to deliver, with a duration and frequency of use depending on the service application, at stated ambient conditions, immediately after operating at the continuous power restricted to 1 hour in a 12 hour time span.

Stationary

Diesel Engines for Power Generation

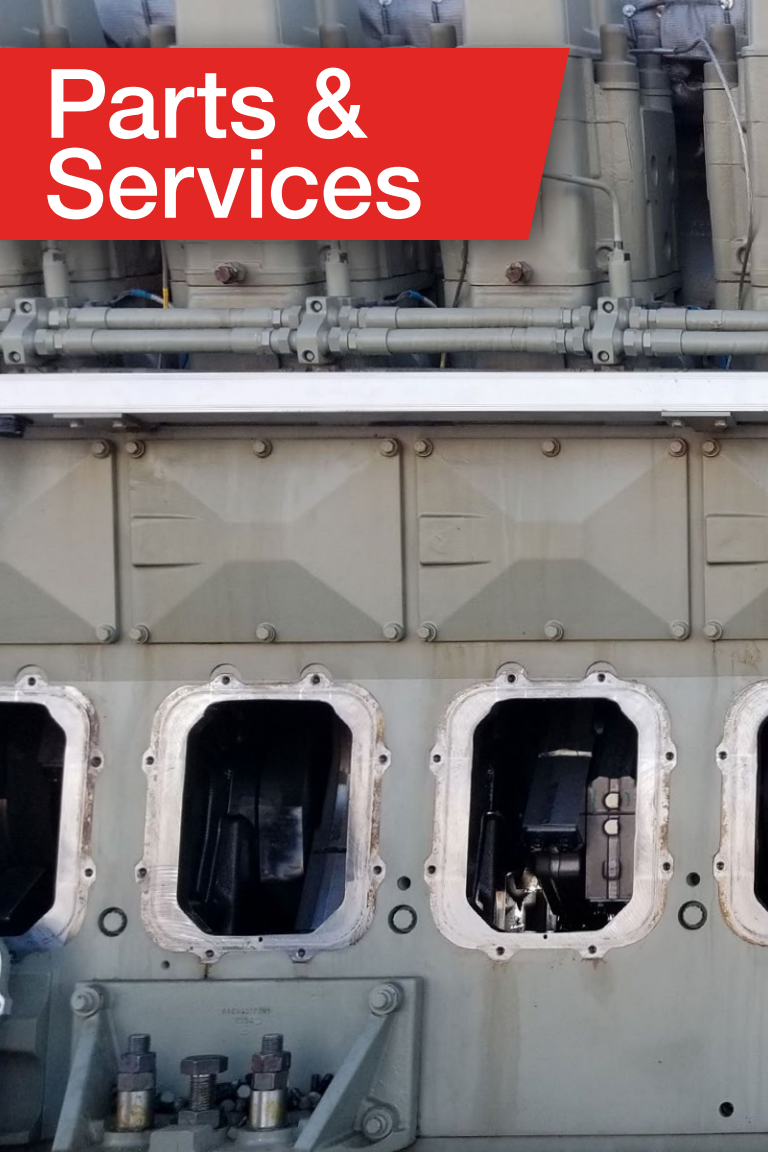


The 250SDC EPA Tier 4 emissions-compliant stationary power engine series includes both inline and V models, delivering a continuous power range from 1,560 bkW to 4,230 bkW (2,091 bhp to 5,670 bhp). The standalone power-generation engines contain all necessary on-engine equipment, can operate in all power-generation modes, and are available in 6L, 8L, 12V and 16V cylinder models. The 250SDC stationary engine meets EPA Tier 4 emissions standards with our advanced exhaust gas recirculation technology and without the need for urea aftertreatment.

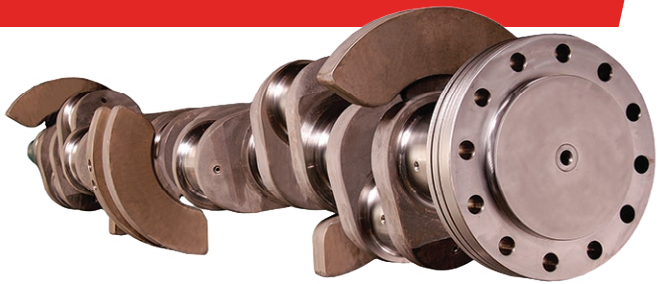
900 RPM 60 Hz	Engine (bkW)			Engine (bhp)		
	Continous	Prime	Standby	Continous	Prime	Standby
16V250SDC	3,780	4,200	4,620	5,067	5,630	6,193
12V250SDC	2,835	3,150	3,465	3,800	4,223	4,645
8L250SDC	2,080	2,250	2,475	2,788	3,016	3,318
6L250SDC	1,560	1,700	1,870	2,091	2,279	2,507

1000 RPM 50 Hz	Engine (bkW)			Engine (bhp)		
	Continous	Prime	Standby	Continous	Prime	Standby
16V250SDC	4,230	4,700	5,170	5,670	6,300	6,930
12V250SDC	3,150	3,500	3,850	4,223	4,692	5,161
8L250SDC	2,250	2,500	2,750	3,016	3,351	3,686
6L250SDC	1,710	1,900	2,090	2,292	2,547	2,802

Parts & Services



Parts & Services



Genuine OEM parts and services are available from Authorized Wabtec Partners to keep your installed base in top shape. Wabtec's spare parts are manufactured to precise tolerances in the same factory as our Diesel Engines, where they undergo stringent testing to ensure quality, reliability, longevity and safety. Only by using genuine spare parts can you maintain the integrity, performance and reliability of your diesel engine and even prolong the useful life of the engine.

Worldwide shipping is available from our distribution center with expert teams supporting 24/7/365 operations.

To find your local Authorized Wabtec Partner visit:
wabteccorp.com/marine-solutions

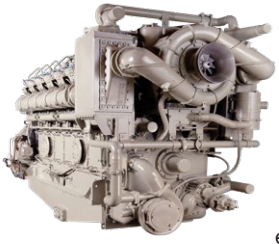
Remanufactured Solutions

Our remanufactured component solutions enable customers to replace old serviceable components with certified OEM quality replacements.

Customers can choose to purchase remanufactured components through Repair and Return or Unit Exchange options, where offered and applicable for that given component. In either case, units go through a comprehensive teardown, requalification, and assembly process that ensures remanufactured units perform at par with corresponding new units.

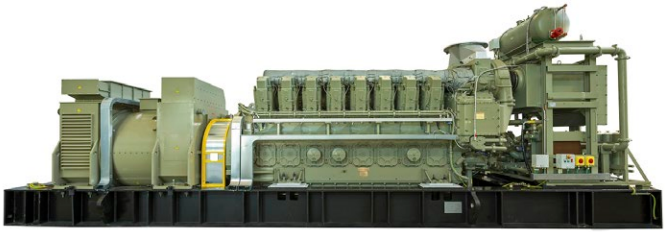
Available at a fraction of the cost of purchasing new parts, Wabtec's certified remanufactured component solutions extend the life of the component and restore original performance.

Legacy Product Support



Wabtec's legacy V228 marine engine was introduced more than 15 years ago. Over 300 engines have been deployed in some of the world's most challenging industrial environments and proven to be among the most dependable, durable and fuel-efficient engines available in the market.

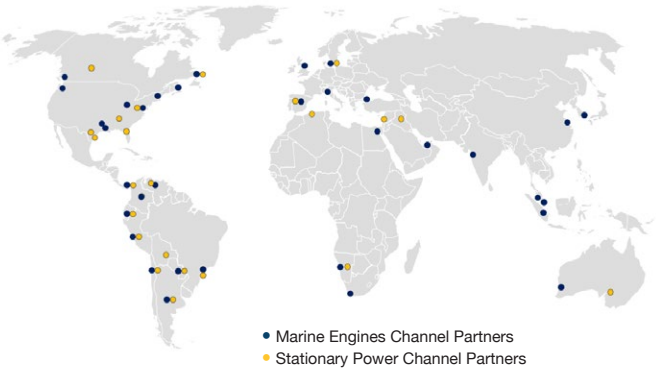
This engine series is renowned for its rugged modularized construction and unitized cylinder assembly concept which enables quick change outs for ease of maintenance and increased engine uptime. While this engine series is superseded by the 250 series, which is based on more advanced engine technology, genuine OEM V228 spare parts and services remain available from our partner network to support the installed base.



Wabtec delivered over 500 legacy V228 and V250 series diesel engines and generator sets for dependable, long lasting, and fuel-efficient stationary power solutions. Genuine OEM spare parts and services remain available from our partner network to support the installed base.

Global Distribution Network

Wabtec's Diesel Engine Channel Partners



With more than 22,000 engines in service worldwide in some of the most challenging industrial environments, Wabtec's medium-speed engines are proven to be among the most dependable, durable and fuel-efficient engines available in the market. Wabtec's engines are supported by an extensive parts distribution and service centers network available 24/7 world-wide.

Learn from the diesel engine experts.

In addition to product and service support, Wabtec provides comprehensive instruction in diesel engine maintenance. The learning facility in Erie, Pennsylvania, features classrooms, computer-simulated training and an engine laboratory. Our instructors also provide on-site training at customer locations around the world. We offer custom-designed instructional courses, computer-based learning aids, expert technical advisors, training videos and train-the-trainer programs.

Marine class certifications:

- ABS
- BV
- DNV
- LR
- KR
- RINA
- RS

Quality certifications:

- ISO 9001:2015

Appendix

Appendix

Definitions

Maximum continuous rating (MCR) Maximum speed and load conditions at which the engine is capable of operating continuously for an unlimited number of hours per year.

Overload Power is power which an engine may be permitted to deliver, with a duration and frequency of use depending on the service application, at stated ambient conditions, immediately after operating at the continuous power restricted to 1 hour in a 12 hour time span.

Continuous power (COP) The maximum power which the generating set is capable of delivering continuously while supplying a constant electrical load when operated for an unlimited number of hours per year.

Prime power (PRP) The maximum power which a generating set is capable of delivering continuously while supplying a variable electrical load when operated for an unlimited number of hours per year. Load factor over a 24-hour period is less than 70%.

Limited-time running power (LTP) The maximum power available for which the generating set is capable of delivering for up to 500 hours of operation per year. Load factor may be up to 100%.

Emergency standby power (ESP) The maximum power available during a variable electrical power sequence for which a generating set is capable of delivering in the event of a utility power outage or under test conditions for up to 200 hours of operation per year.

FPP A vessel where the engine powers a fixed pitch propeller.
Examples: tug boats, cargo vessels, fishing vessels

FPP-HT A vessel where the engine powers a fixed pitch propeller which demands extended maximum engine torque.
Examples: river push boats, tow boats, dredge pumps

CPP/EPP-VS A vessel where the engine operates at a variable speed to power a controllable pitch or an electrically powered propeller

CPP/EPP-CS A vessel where the engine operates at a constant speed to power a controllable pitch or an electrically powered propeller

Drawing on over 150 years of experience, we are leading the way in safety, efficiency, reliability, innovation, and productivity. Whether it's freight, transit, mining, industrial, or marine, our expertise, technologies, and people – together – are accelerating the future of sustainable transportation.

To learn more, contact us:
MSDProducts@wabtec.com

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