

VHP® Series Four® VHP7104GSI

Enginator® Generating System with ESM® 2 and emPact Emission Control System

1,050 - 1,200 kW



Technical Data

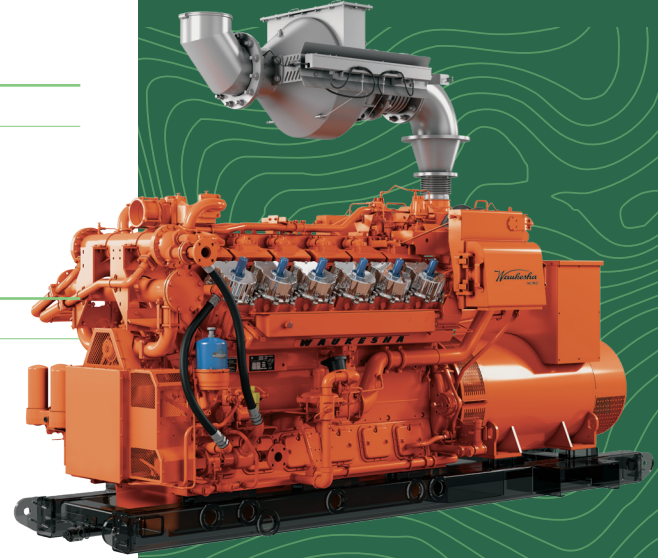
| | |
|------------------------------|---------------------------------|
| Engine | L7044GSI, four cycle |
| Cylinders | V12 |
| Piston displacement | 7,040 cu. in. (115 L) |
| Compression ratio | 8:1 |
| Bore & stroke | 9.375" x 8.5" (238 x 216) |
| Jacket water system capacity | 100 gal. (379 L) |
| Lube oil capacity | 190 gal. (719 L) |
| Starting system | 24V each |

Dimensions l x w x h inch (mm)

| | |
|-------------------------|-----------------------------------------|
| Heat exchanger | 235 (5,970) x 85 (2,160) x 103 (2,620) |
| Water connection | 205 (5,208) x 85 (2,160) x 103 (2,620) |
| Radiator | 260 (6,600) x 124 (3,150) x 160 (4,060) |

Weights lb (kg)

| | |
|-------------------------|-----------------|
| Heat exchanger | 40,000 (18,140) |
| Water connection | 38,000 (17,230) |
| Radiator | 46,000 (20,860) |



Engine supplied with 3-way catalyst but without exhaust piping. Engine-out and catalyst-out exhaust piping shown for illustrative purposes only.

INNIO's Waukesha® VHP® Series Four® rich-burn engines are the engines of choice for the harshest and most demanding power generation applications. Reliable 12 cylinder VHP generator sets are ideal for remote sites.

ESM® 2 is the next-generation engine controller, adding functionality and benefits to the proven ESM platform.

The ESM 2 customer interface is a 12" full-color touch screen display panel that allows users to see all engine parameters, trend data, view manuals, and walk through troubleshooting steps, eliminating the need for a laptop computer.

ESM 2 directly reads exhaust and main bearing temperatures sensors and adds crankcase pressure, boost pressure, and an oil pressure permissive for starting the engine to the list of sensors available with the previous version of ESM.

Enhanced misfire detection can capture a single misfire event and an enhanced three-dimensional timing map allows for tighter engine control over the entire range of fuels.

Waukesha's emPact Emission Control System combines an engine, catalyst, and air/fuel ratio control, factory-designed for optimal interaction and maximum performance. It consists of a factory-supplied catalyst, pre- and post-catalyst oxygen sensing, and differential temperature and pressure sensors. emPact's closed-loop control system measures the engine exhaust and automatically adjusts the air/fuel ratio to keep the catalyst operating at maximum efficiency, even as speed, load, fuel, and ambient conditions change.

A POWERFUL FUTURE

Waukesha

VHP Series Four VHP7104GSI

Performance Data

| Intercooler Water Temperature 130°F (54°C) | | Continuous Power | |
|-------------------------------------------------|-----------------------------------------------------------------|-------------------|-------------------|
| | | 60 Hz 1200 RPM | 50 Hz 1000 RPM |
| | Power kW (heat exchanger/water connection cooling) | 1,200 | 1,100 |
| | Power kW (radiator cooling) | 1,150 | 1,050 |
| | BSFC (LHV) Btu/bhp-hr (kJ/kWh) | 7,881 (11,149) | 7,603 (10,757) |
| | Fuel Consumption Btu/hr x 1000 (kW) | 13,240 (3,881) | 11,709 (3,430) |
| emPact Catalyst- Out Emissions (GSI only) | NOx g/bhp-hr (mg/Nm ³ @ 5% O ₂) | 0.5 (185) | |
| | CO g/bhp-hr (mg/Nm ³ @ 5% O ₂) | 1.0 (370) | |
| | NMHC g/bhp-hr (mg/Nm ³ @ 5% O ₂) | 0.14 (58) | |
| | THC g/bhp-hr (mg/Nm ³ @ 5% O ₂) | 1.26 (477) | |
| Engine-Out Emissions | NOx g/bhp-hr (mg/Nm ³ @ 5% O ₂) | 13.30 (4,922) | 12.20 (4,518) |
| | CO g/bhp-hr (mg/Nm ³ @ 5% O ₂) | 11.20 (4,140) | 9.20 (3,392) |
| | NMHC g/bhp-hr (mg/Nm ³ @ 5% O ₂) | 0.35 (131) | 0.34 (127) |
| | THC g/bhp-hr (mg/Nm ³ @ 5% O ₂) | 2.40 (873) | 2.30 (843) |
| Heat Balance | Heat to Jacket Water Btu/hr x 1000 (kW) | 3,849 (1,128) | 3,495 (1,024) |
| | Heat to Lube Oil Btu/hr x 1000 (kW) | 567 (166) | 475 (139) |
| | Heat to Intercooler Btu/hr x 1000 (kW) | 179 (53) | 144 (42) |
| | Heat to Radiation Btu/hr x 1000 (kW) | 724 (212) | 656 (192) |
| | Total Exhaust Heat Btu/hr x 1000 (kW) | 3,900 (1,143) | 3,270 (958) |
| Intake/Exhaust System | Induction Air Flow scfm (Nm ³ /hr) | 2,424 (3,651) | 2,151 (3,239) |
| | Exhaust Flow lb/hr (kg/hr) | 11,273 (5,113) | 10,003 (4,537) |
| | Exhaust Temperature °F (°C) | 1,179 (637) | 1,125 (607) |
| | Radiator Air Flow scfm (m ³ /min) (radiator cooling) | 100,000 (2,832) | 85,000 (2,407) |

Rating Standard: The Waukesha Enginotor ratings are based on ISO 3046/1-1995 with an engine mechanical efficiency of 90% and auxiliary water temperature T_{cr} as specified limited to ±10°F (±5°C). Ratings also valid for ISO 8528 and DIN 6271, BS 5514 standard atmospheric conditions.

Continuous Power Rating: The highest electrical power output of the Enginotor available for an unlimited number of hours per year, less maintenance. It is permissible to operate the Enginotor with up to 10% overload for two hours in each 24 hour period.

All data according to full load and subject to technical development and modification.

emPact catalyst-out emissions valid from 100% - 75% load and 1200 rpm to 900 rpm and assume proper engine/catalyst maintenance and manual adjustment as necessary.

Consult your local Waukesha representative for system application assistance. The manufacturer reserves the right to change or modify without notice, the design or equipment specifications as herein set forth without incurring any obligation either with respect to equipment previously sold or in the process of construction except where otherwise specifically guaranteed by the manufacturer.

Waukesha – an INNIO brand - INNIO's Waukesha engines are at the forefront of the energy transition, providing reliable and compliant energy solutions for distributed gas compression and power generation applications. The brand's rich and lean-burn engines, ranging from 335 hp to 5,000 hp, set an industry standard for low emissions, high reliability, and fuel flexibility.

Waukesha products are continuously upgraded to help operators stay emission-compliant without sacrificing operational excellence. These upgrades include new and remanufactured engines and parts, as well as conversion and modification kits, all of which are backed by OEM warranty and more than 115 years of engine expertise. Additionally, our Waukesha digital solutions include a collaborative solution with Detection Technologies for gas compression applications and INNIO's myPlant platform for power generation applications. Both solutions provide customers with enhanced monitoring and optimization capabilities, resulting in improved performance and reduced downtime.

We connect locally with our customers to enable a rapid response to their service needs, providing enhanced support through our broad network of distributors and solution providers with parts, services, and digital offerings.

Waukesha engines are engineered in Waukesha, Wisconsin, U.S., and manufactured in Welland, Ontario, Canada. To learn more about the company's products and services, please visit INNIO's website at www.waukeshaengine.com or follow Waukesha engines on [LinkedIn](https://www.linkedin.com/company/waukeshaengine).

IWK-123040-EN

© Copyright 2023 INNIO Waukesha Gas Engines Inc. Information provided is subject to change without notice. All values are design or typical values when measured under laboratory conditions. INNIO, Waukesha, VHP, Enginotor and ESM are trademarks or registered trademarks of the INNIO Group, or one of its subsidiaries, in the United States and in other countries. All other trademarks and company names are property of their respective owners.

