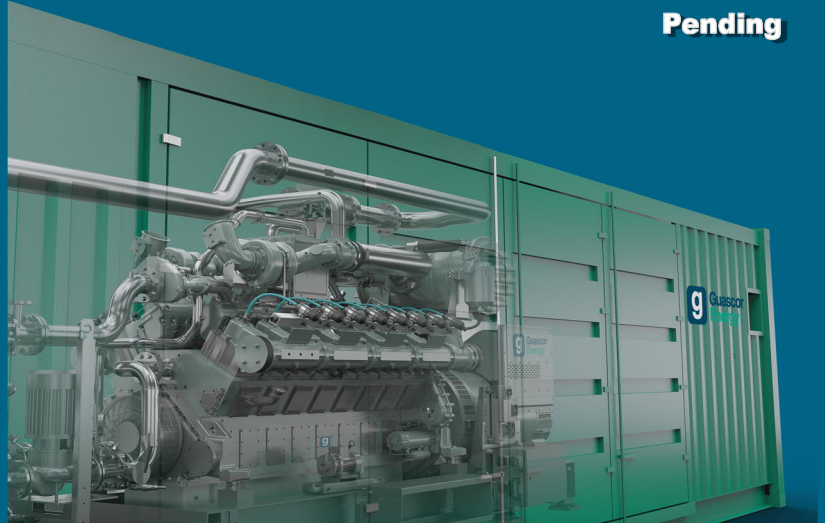


# H1000

# 1 MW

## MOBILE GAS GENERATOR SET

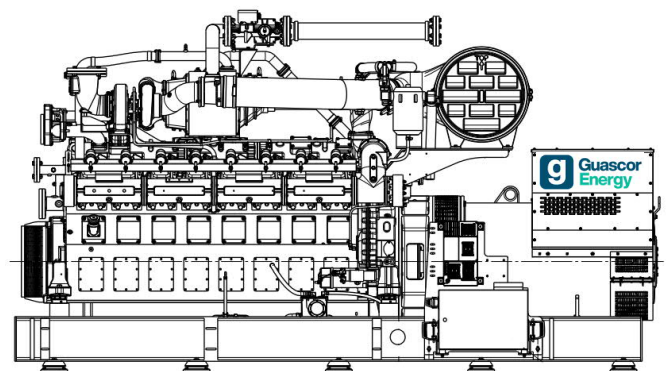
**Patent  
Pending**



The Guascor Energy H1000 is a containerized, mobile certified, gas fuel driven generator set. Designed for versatility and in field use, this generator set can provide continuous rated power of 1000 kW on a variety of gas fuels including NG, LPG and Well gas without derate. EPA Mobile certified and fully enclosed this unit provides a mobile, versatile power generation module for all your applications.

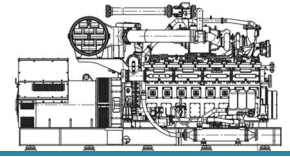
#### Key features:

- Mobile Certified EPA 1048 for NG, LPG and Well gas
- 1000 kW continuous rated 24/7, on all three fuel
- Self contained trailer solution—drop, hook up and go
- Robust proven engine , low operating costs and ease of maintenance
- Operated from a trailer or dismount for ground application.
- Flexible easy to operate controls  
Operate alone or with other units as a group



# Technical Scope of Supply

## Generator Set



### Engine

Engine model	G-56SL- EPA
Rated rpm	1800
Rated Power (ISO COP)	1431 bhp (1067 kW)
Cylinder arrangement	V – 16
Displacement	3436 cu.in (56 liters)
Bore x stroke	6.3 x 6.89 in (160 x 175 mm)
Compression ratio	8 : 1
Mean piston speed	413 in/s
Aspiration:	Turbo Charged and Intercooled
Exhaust manifold type	Wet
Control Unit (ECU):	GCSE, Digital governor, AFR Ignition Detonation and unit protection

Performance in accordance with ISO 3046/1

### Alternator

Rating:	1250 KVA
Voltage:	480v, 60Hz
Type:	Synchronous, brushless
Duty:	Continuous duty
Isolation/Temperature rise:	Class H / Class F
Protection	IP23
Excitation type:	AREP (PMG as optional)
AVR:	Electronic
Bearings:	2 — Close coupled
Winding pitch:	2/3 – standard 6 wire
Voltage regulation:	± 0.25 % (Steady State)
Short circuit current withstand:	3 x In for 10Sec
Harmonic Distortion (THD)	< 3.5%
Waveform: TIF	< 50
Norms:	IEC 60034, NEMA MG-1.32-33 ISO 8528/3, CSA-22.2-100, UL 1446
Heating:	Included

### Cooling System

Cooling system	2 circuits (HT & LT)
Oil cooler	In LT
Intercooler stages	Two stage IC (1 <sup>st</sup> LT & 2 <sup>nd</sup> HT)

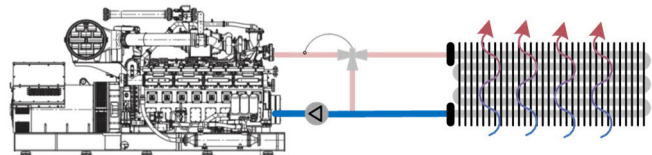
#### Jacket (HT) Water circuit

Outlet Temperature	194°F (90 °C)
Capacity	150 gal (565 L)

#### Intercooler (LT) Water circuit

Inlet Temperature	131°F (55°C)
Capacity	80 gal (300 L)

Water Pumps	Engine driven—Mechanical pumps for and HT and LT circuits
Thermostats	Mechanical—Integrated
Radiator	Horizontal, dual bank design, HT & LT in single unit Multistage electric fans, Integral expansion tank



### Engine Lubrication

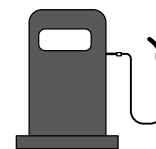
Lube oil pump	Gear mechanical pump
Pre-lube pump	External electric 24v DC
Lube oil pan capacity	72 gal
Make up tank capacity	80 gal
Filters	3 Full flow type—service item
Approx. oil consumption,	0.06 gal/hr

### Starting System

Starter	Electric x 2, 24v DC
Batteries	Dual system 2 @ 2 x 12vdc heavy duty Skid mounted with local isolator
Charging	Charger and maintainer integral to control system, plus external maintainer socket

# Technical Scope of Supply

## Fuel System & Emissions



### Fuel Types

#### Natural Gas

Lower heating Value (LHV)	950—1050 btu/scft
Methane Number (MN)	Nominal 75 (range 70 to 80)
Specification	IC-G-D-30-021

#### Non Commercial Gas (Well Gas)

Lower heating Value (LHV)	800 — 1600 btu/scft
Methane Number (MN)	Nominal > 45
Specification	IC-G-D-30-139

#### LPG — Propane (> 85% C3H8)

Lower heating Value (LHV)	2400 — 2680 btu/scft
Methane Number (MN)	NA
Recommended Specification	HD5 Propane IC-G-D-30-138

### Gas Train

Fuel Pressure Range:	2 to 7 PSI
Fuel Control:	Electronic—Tecjet
Connection:	ANSI flanged
Norms:	NFPA 37 (2021) CSA 149.1 & 6.5 Regional Codes on request

Includes: Isolation Valve, double solenoid valve, low and high pressure switches, regulator and filtration.

### Control System

An integrated digital control system provides robust and reliable operation, monitoring and protection for the complete unit. With ease of accessed through a large HMI the operator is provided a simple to navigate user interface for set up, control and local or remote system monitoring. Fully integrated with the engine ECU and all the unit ancillaries to ensure complete reliable unit operation.

#### Key features of the control system:

- Engine ECU integration—seamless control of genset.
- Genset protection including :  
25, 32, 40, 27/59, 81, 50,51, 46, 47
- Integrated 2000A generator breaker with O/L protection
- Multiple modes of operation—see page 6 (Performance)
- HMI, large easy to use operator interface, providing status and control of complete unit, offering multi-lingual support,
- Includes systems for shore power, battery charging, lighting and management of all ancillaries
- Integration to other unit—for multi unit applications
- Integrated security to prevent un-authorized operation
- Remote access—options available to remotely access the unit for control, monitoring and data accusation 24/7 365 days of the year.

### Emissions

The engine emissions are certified under the U.S.EPA regulations for non road and stationary large spark ignited gas engines 40 CFR 60 JJJJ, 1048 and 1065.

Engines Fitted With Catalyst

	NG	WG	LPG
<b>NOx (g/bhp.hr)</b>	1	1	1
<b>CO (g/bhp.hr)</b>	< 0.4	< 0.4	< 0.4
<b>NMHC (g/bhp.hr)</b>	< 0.3	< 0.3	< 0.3
<b>CO2 (lb/hr)</b>	1438	1576	1664

Engines Without Catalyst

	NG	WG	LPG
<b>NOx (g/bhp.hr)</b>	1	1	na
<b>CO (g/bhp.hr)</b>	< 1.8	< 1.8	na
<b>NMHC (g/bhp.hr)</b>	< 0.6	< 0.6	na
<b>CO2 (lb/hr)</b>	1438	1576	na

The engine emission are managed by the Guascor Energy GCSE using unique closed loop control and a NOX value to ensure emission compliance under all operating conditions.

# Technical Scope of Supply

## Enclosure



### General

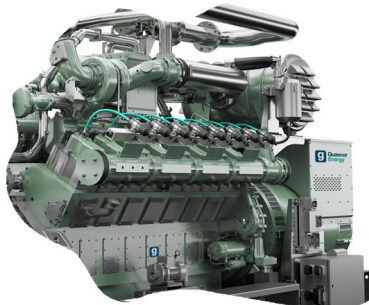
All equipment is enclosed within a weather tight enclosure and built on a reinforced heavy duty base frame. The enclosure can be ground mounted or operated from a chassis trailer.

Ease of access is provided for all site connections to ensure efficient site installation.

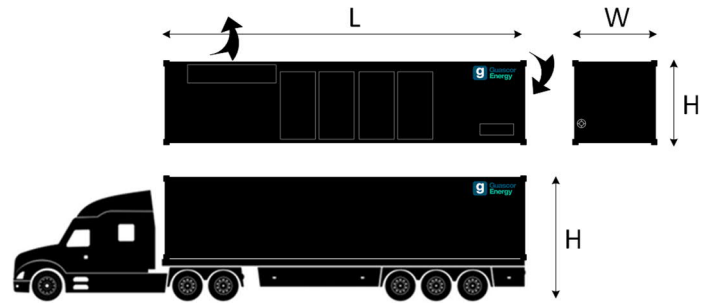
The unit controls can be accessed from the outside of the unit or via remote link, with maintenance access provided by large side doors to ensure service and downtime are minimized..

Key features:

- Attenuation: High density insulation and intake silencing and exhaust silencing to minimize break out noise allowing easy placement of unit for all applications.  
  
Breakout Noise                      75 dB(A) at 10 meters  
Integral Exhaust attenuation      75 dB(A) at 10 meters
- Spill containment built into enclosure base frame for all onboard fluids
- External stack (optional) to raise stack height if needed
- Easy access to integration hookups, for power—though busbars or optional quick connectors (Cam Lock), gas fuel though ANSI flanged connection and shore power and remote control if required
- Integrated Lifting points
- Genset vibration isolation
- Ease of access to maintenance hookups for oil changes and fluids access
- Integrated fire and gas protection with alarms and annunciation, Integral fire extinguishers
- External Shore power connection for ancillary systems, heating, battery charging lights while unit is stopped.
- Integral oil make-up tank with external fill access and level gauge



### Dimensions



Length L	45 feet
Height H	9 feet (Without Trailer) 13.2 feet (With Trailer)
Width W	8 feet

*Guascor Reserves the right to adjust the dimension without notice, please consult factory for additional information*

### Trailer Option

- 3 Axle chassis trailer
- Brake system, drum, steel outboard mounted
- Integral storage for accessories
- Ladders and handrails

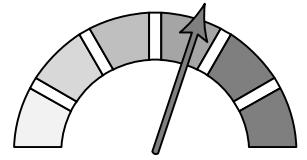
### Ventilation and Cooling system

The integrated radiator ensures the engine heat of combustion is optimally dissipated, with multi fan design and staged operation only the fans required to dissipate the heat are operated to minimize auxiliary loads and maximize part load fuel efficiency.

Integral ventilation to provide radiant cooling and combustion air, operates automatically to maintain correct engine operating temperature

Dampers on the unit close when the unit is stopped or during transportation to provide protection from the elements.

# Performance



## Technical

Name	Units	State	Natural Gas	Well Gas	Propane
Mechanical power	BHP	100% load	1431	1431	1431
	kW	100% load	1067	1067	1067
Rated Speed	RPM		1800	1800	1800
Electrical power Cosφ 1	kWe	100% Load	1030	1030	1030
Electrical power Cosφ 0.8	kWe	100% Load	1018	1018	1018
Electrical Efficiency	%	100% Load	32.1	31.1	32.1
Fuel Consumption	MMBTU/hr	100% Load	10.96	11.29	10.96
		80% Load	8.90	9.16	8.90
		60% Load	6.89	7.09	6.89
Fuel LHV	BTU/SCF		931	1610	2415
Fuel Flow	SCF/hr	100% Load	11769	7012	4538
Heat rate	BTU/kWhr	100% Load	10638	10959	10638
Jacjet temperature	°f	100% Load	194	194	194
Aux temperaure	°f	100% Load	131	131	131
Exhaust temperature	°f	100% Load	941	981	948
Ignition timing	Deg	100% Load	26	22	26

## Temperature and Altitude information

System operating conditions:

Temperature 0°F to 105°F  
Altitude < 1650 ft

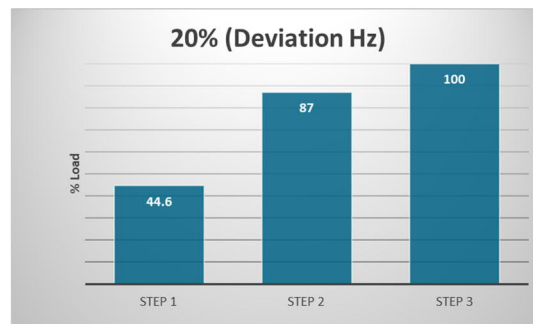
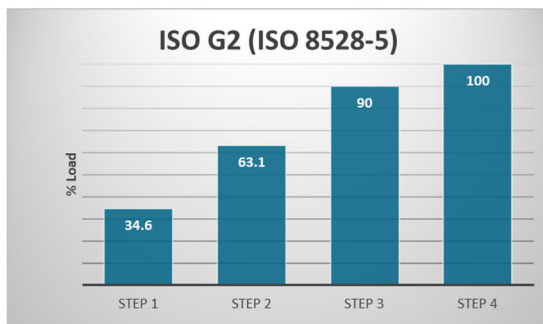
Nominal engine conditions

Temperature 32°F to 77°F  
Altitude < 1650 ft  
Pressure 30" Hg

The table below indicates the derate factor for conditions exceeding the nominal

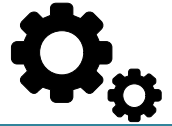
Altitude	Natural Gas			Well Gas			Propane		
	→ 77°F	86°F	95°F	→ 77°F	86°F	95°F	→ 77°F	86°F	95°F
1640 ft	1	0.99	0.98	1	0.99	0.98	1	0.99	0.98
2625 ft	0.98	0.97	0.96	0.98	0.97	0.96	0.98	0.97	0.96
3609 ft	0.96	0.95	0.94	0.96	0.95	0.94	0.96	0.95	0.94
4593 ft	0.94	0.93	0.92	0.94	0.93	0.92	0.94	0.93	0.92
5577 ft	0.92	0.91	0.90	0.92	0.91	0.90	0.92	0.91	0.90
6562 ft	0.90	0.89	0.88	0.90	0.89	0.88	0.90	0.89	0.88

## Load Acceptance Data



**Load Acceptance:**  
Nominal % of rated load that can be applied to maintain rate voltage and frequency.  
Other condition can affect th performance contact factory for details

# Performance



## Modes of Operation

The generator set is designed with versatility in mind, as standard it includes operating modes for most applications. The control system includes a power panel with dedicated sync capable breaker, engine ECU integration, ancillary control, battery charging and a primary controller offering as a minimum the following features and modes of operation:

- Island mode:**  
 Single unit operating isolated from a utility (shore power required for starting)
  - Grouped Island:**  
 Integrated synchronization capabilities allow parallel operation with other units, up to 32 units can share load in a distributed island group
  - Grid Parallel:**  
 Operating synchronized to a utility to provide base load or peak shaving power. The system includes a utility grade intertie protection relay for compliance with utility protection schemes.
  - Emergency Power :**  
 On demand starting to provide emergency or back up power.
- Features:**
- Emergency stop—integrated onto container for emergency shutdown
  - Microgrid integration - designed for ease of integration to a distributed energy scheme or microgrid
  - Large 10" touchscreen user interface
  - Cyber security by design—ISA 62443 (L2)
  - Data storage and remote access options for efficient fleet management

**Important Notes:**  
 Values presented in accordance with ISO 8528, BS5514 and ISO3046, Continuous duty—100% rated load without varying load for unlimited hours,  
 Tolerances: Fuel Consumption +5%, Exhaust temp  $\pm 20^{\circ}\text{C}$ , heat balance  $\pm 10\%$   
 Ratings indicated—Gross: exclude mechanical pumps and internal loads  
 Valid for ambient conditions  $25^{\circ}\text{C}$ , altitude 500m, for other conditions see rating chart.

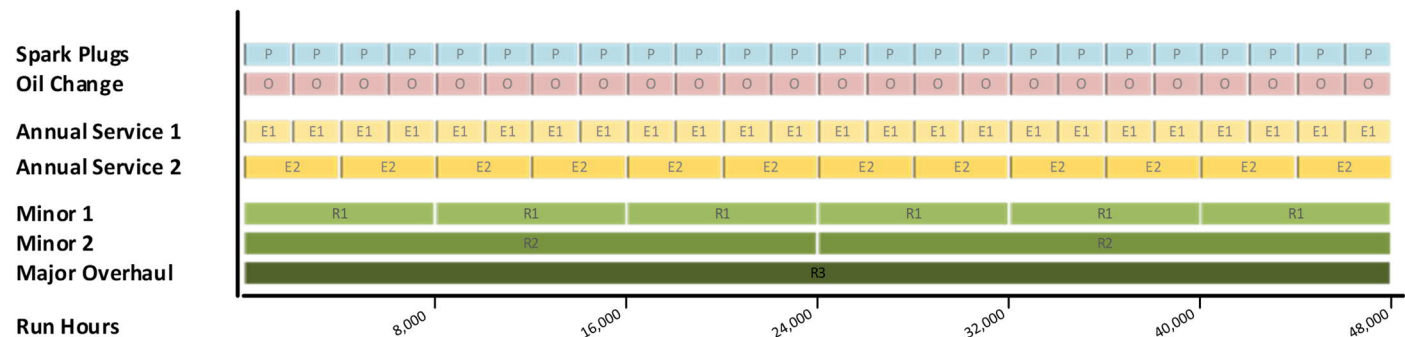
# Maintenance



## Schedules

Designed to ensure maximum interval between maintenance interventions, ensuring maximum asset revenue. The container design provides ease of access for maintenance personnel to minimize down time for routine service tasks, oil changes and fluid checks, all of which can be completed from outside the container. Large access doors provide access for annual service and overhaul activities maintaining the engine in frame.

The table below presents a typical life cycle schedule based on continuous operation and applicable for all three approved fuels.



The table presents typical maintenance program—for reference only, highlighting only the key aspects of the service tasks, refer to IO-G-M-136 and associated documents for additional details. Emission compliance requires mandatory compliance with the maintenance routine, failure to follow the required schedule of tasks may invalidate the emissions certification. Guascor energy reserve the right to modify the presented date without notification.





**Factory Authorized Distributor**



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***Designed for success***  
***Customer Focused***

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