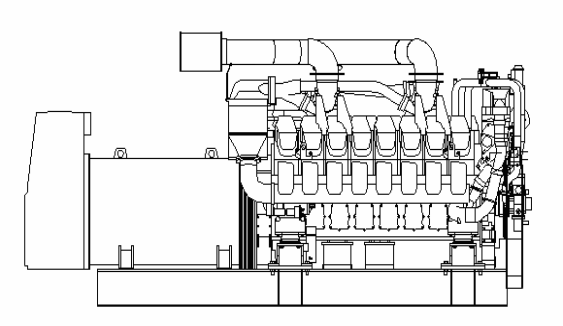
MAQUINARIA IGSA
POWER GENERATION SYSTEMS



MODEL: GSDD22000M
DIESEL ENGINE: DETROIT DIESEL
MODEL: 16V4000G83, TIER II
CAPACITY: 2000kW; 1800 RPM

RATINGS RANGE	
PRIME hp (kW)	STANDBY hp (kW)
3057.4(2280)	3352.4(2500)

Reference Conditions ISO 3046:	Standard	Power available up to
Intake air temperature	25°C (77°F)	40°C(104°F)
Side altitude above sea level	100 m (328.08ft)	400m(1312.3ft)
Charge air coolant temperature	45°C(113°F)	60°C(140°F)

STANDARD FEATURES

Complete system designed and built at ISO9001 certified facility

● Factory tested to design specifications at full load conditions.

● Fully engineered with a range of options and accessories.

1 IGSA Genset´s are composed of 16 cylinders in V and four strokes diesel engine for industrial stationary applications. Those equipments are fully factory tested using a resistive load. (1) Hour ramp 100% load test.

2 Base of structural steel

3 The controls and accessories are selected to work together to achieve the maximum operational performance and security.

4 Exhaust: stainless steel exhaust flex and ANSI outlet flange.

5 Engine **DETROIT DIESEL**, **16V4000G83 TIER II**

6 Alternator**, Marathon**

7 Control MEC 310 panel USC300.

8 Radiator

9 Standard and optional equipment may vary for UL 2200 listed packages. UL 2200 listed packages may have oversized generators with a different temperature rise and motor starting characteristics.

GENERAL FEATURES

- **IGSA GENSET** of**, 2000 KW to 480V, 460V, 440V, 416V, 380V;** 3 Phase **(**4 Wire) **or 4160V, 13200 VAC,** 3 Phase **(**3 Wire), 60 Hertz, is composed by an internal engine four strokes coupling with the alternator, controls and accessories totally assembled and tested in factory.
- The controls and accessories of the Genset are selected to provide the maximum in efficiency and Security
- The generator set its components are tested factory-built, and production-tested.
- The genset engine is certified by the Environmental Protection Agency (EPA) to conform to Tier II nonroad emissions regulations.
- Electronic engine controls manage the engine (isochronous)
- Integrated complete system control and monitoring (ADEC)

ENGINE SPECIFICATION DATA MODEL 12V4000G83
Engine Weight 16975.3 Lb (7700kg)

General Data	
Model	16V4000G83
Combustion System	Direct Injection
Chargin method	Exhaust turbo charger and Water charge air
	Cooling external
Bore x Stroke	170/210 mm
Displacement, total	76.5 Liter
Number of cylindres	16
Cylinder configuration	V - 90°
Compression Ratio	16.5 : 1
Direction of rotation	Left
Flywheel housing flange	SAE 00
Flywheel interface	21"
Starter ring-gear teeth no.	182
Injection system	Common Rail System with Electronically controlled
	high-pressure injection
Control/Monitoring	Electronic engine Management system ADEC
Number of turbo chargers	4
Number of intercooler	1
Power (ISO 3046)-- kW	2500
Mean Piston speed—ft/min (m/s)	2480.04(12.6)
Mean effective pressure	21.9
Physical Data	
Weight, dry—Lb (kg)	16975.3(7700)
Weight, wet-- Lb (kg)	-
Length--in.(mm)	See installation drawing
Height--in.(mm)	See installation drawing
width--in.(mm)	See installation drawing
Fuel Consumption	
100 % Power-- g/kWh	210
75 % Power-- g/kWh	212
50 % Power-- g/kWh	221
Lube oil consumption (after run in)	-
Capacity	
Engine oil Cap, ininitial Filling (standard oil system)--Gl (Lt)	79.25 (300)
Oil pan capacity, dipdtick mark min.-- Gl (Lt)	55.47 (210)
Oil pan capacity, dipdtick mark max.-- Gl (Lt)	63.40 (240)
Engine coolant capacity (without equipment)-- Gl (Lt)	68.68 (260)
Intercooler coolant capacity-- Gl (Lt)	13.2 (50)
Heat dissipation	
Engine coolant dissipation 100% load-- kW	930
charge-air heat dissipation 100% load-- kW	680
Radiation and convection heat, engine-- kW	90
Noise emission	
(Free-field sound pressure level, 1m distance)	
Engine surface noise-- dB(A)	-
Exhaust noise, unsilenced-- dB(A)	-

Starter System		
Electrical Starter		24
Starter, rated voltage-- V		2 x 7.5
Starter, rated power-- kW		-
Starter, power requirement max-- A		-
Starter, power requirement at firing speed-- A		-
Recommended battery capacity	Lead-acid-- Ah/20h	-
	NiCd--Ah/5h	-
Firing speed--1/min		80-120
Coolant pre-heating		
Preheating temperature (min.)-- °C °F()		32 (89.6)
Heater performance-- kW		9.0
Coolant system, Engine coolant circuit		
Coolant temperature (at engine outlet to cooling equipment)-- °C °F()		100 (202)
Coolant temperature after engine, alarm-- °C °F()		102 (215.6)
Coolant temperature after engine, shutdown-- °C °F()		104(219.2)
Coolant antifreeze content, max. Permissible-- %		50
Cooling equipment: coolant flow rate-- m³/h		81
Coolant pump: inlet pressure, min.-- bar		0.4
Coolant pump: inlet pressure, max.-- bar		1.5
Pressure loss in off-engine cooling system, max. Permissible-- bar		0.7
Cooling equipment: height above engine max. Permissible-- m		15.2
Cooling equipment: design pressure max. Permissible-- bar		2.5
Coolant system, Charge-air coolant circuit		
Coolant temperature before intercooler (engine inlet)-- °C °F()		45 (113)
Coolant antifreeze content, max. Permissible-- %		50
Cooling equipment: coolant flow rate-- m³/h		35.5
Pressure loss in off-engine cooling system max. Permissible-- bar		0.7
Cooling equipment: Height above engine max. Permissible-- m		15.2
Cooling equipment: design pressure max. Permissible		2.5
Combustion Air m³/s		**3.2**
Combustion air volume flow new filter-- mbar		15
Intake air depression limit value-- mbar		50
Fuel System		
Fuel supply flow, max.-- l/min		25
Fuel temperature max. °C °F()		55 (131)
Fuel pressure at supply connection on engine, min. Admissible-- bar		1.5
Fuel pressure at supply connection on engine, max. Admissible-- bar		-0.1
Exhaust system		
Exhaust volume flow-- m³/s		8.4
Exhaust temperature after turbocharger-- °C °F()		505 (941)
Exhaust backpressure limit value-- mbar		85
General operating data		
Recomended minimum continuous load-- %		20
Engine mass moment of inertia, with standard flywheel-- kgm²		23.1

Materials and specifications are subject to change without notice.
The International System of Units (SI) is used in this publication.

MARATHON. ELECTRIC ALTERNATOR MODEL 744RSL4056
Weight 4416.1 kg (9740Lb)

Kilowatt ratings kW (kVA)	1800 RPM 3 Phase	1800 RPM 3 Phase	60 Hertz 0.8 Power Factor	4 Bus Bars Dripproof or Open Enclousure	
Voltage	Class B	Class F		Class H	
	80° C -°F(176) Continuous	105° C -°F(221) Continuous	130° C- °F(266) Standby	125° C- °F(257) Continuous	150° C -°F(302) Standby
480	1700 (2125)	2010(2513)	2210(2763)	2160(2700)	2260(2825)
460	1630 (2038)	1920(2400)	2100(2625)	2060(2575)	2180(2725)
440	1590 (1988)	1860(2325)	2030(2538)	1990(2488)	2100(2625)
416	1520 (1900)	1780(2225)	1950(2438)	1900(2375)	2000(2500)
380	1430 (1788)	1650(2063)	1790(2238)	1750(2188)	1850(2313)

□ Rise by resistance method, Mil-Std-705, Method 680.1b. † Rating per BS 5000.

Submittal Data: 480 Volts, 2500 kVA, 1800 RPM, 60 Hz, 3 Phase (Resistences @ 25° C)- °F(77)

Mil-Std-705B Method	Description	Value
301.1b	Insulation Resistance	> 1.5 Meg
302.1a	High Potential Test	
	Main Stator	2000 Volts
	Main Rotor	1500 Volts
	Exciter Stator	1500 Volts
	PGM Stator	1500 Volts
	Exciter Rotor	1500 Volts
401.1a	Stator Resistance, Line to Line	
High Wye Connection		0.0012 Ohms
	Rotor Resistance	1.245 Ohms
	Exciter Stator	19.44 Ohms
	Exciter Rotor	0.071 Ohms
	PMG Stator	2.2 Ohms
410.1a	No Load Exciter Field Amps	
	at 480 Volts Line to Line	1.00 A DC
420.1a	Short Circuit Ratio	0.789
421.1a	Xd Synchronous Reactance	1.675pu
422.1a	X2 Negative Sequence	
	Reactance	0.154 pu
423.1a	X0 Zero Sequence Reactance	0.121 pu
425.1a	X'd Transient Reactance	0.124 pu
426.1a	X''d Subtransient Reactance	0.107 pu
-----	Xq Quadrature Synchronous	
	Reactance	1pu
427.1a	T'd Transient Short Circuit	
	Time Constant	0.181 sec.
428.1a	T''d Subtransient Short Circuit	
	Time Constant	0.029 sec.
430.1a	T'do Transient Open Circuit	
	Time Constant	3.267 sec.
432.1a	Ta Short Circuit Time	
	Constant of Armatura Winding	0.022 sec

Mil-Std-705b Method	Description	Value
505.3b	Overspeed	2250 RPM
507.1c	Phase Sequence CCW-ODE	ABC
508.1c	Voltage Balance L-L or L-N	0.2%
601.4a	L-L Harmonic Maximum - Total	5.0%
	(Distortion Factor)	
601.4a	L-L Harmonic Maximum - Single	3.0%
601.1c	Deviation Factor	5.0%
--	TIF (1960 Weightings)	<50
625.1c	Mechanical strength (high wye Sustained	
	3 Phase Short Circuit current)	>300%
652.1	a shaft current	
-- Main Stator Capacitance to Ground		0.15 mfd
	Additional Prototype Data	
--	generator Frame	744
--	Type	Ext. Voltage Regulated, Brushless
--	Insulation	Class H
--	Coupling	Flexible
--	Amortisseur Windings	Full
--	Cooling Air Volume	3000 CFM
--	Exciter	Rotating
--	Voltage Regulator	DVR2000E
--	Voltage Regulation	0.25%
--	Sensing	1 or 3 Phase

RATINGS: All three-phase units are rated at 0.8 power factor. All single-phase units are rated at 1.0 power factor. Standby Ratings: Standby ratings apply to installations served by a reliable utility source. The standby rating is applicable to varying loads for the duration of a power outage. There is no overload capability for this rating. Ratings are in accordance with ISO-3046/1, BS5514, AS2789, and DIN 6271. Prime Power Ratings: Prime power ratings apply to installations where utility power is unavailable or unreliable. At varying load, the number of generator set operating hours is unlimited. A 10% overload capacity is available for one hour in twelve. Ratings are in accordance with ISO-8528/1, overload power in accordance with ISO-3046/1, BS 5514, AS 2789, and DIN 6271. For limited running time and base load ratings, consult the factory. The generator set manufacturer reserves the right to change the design or specifications without notice and without any obligation or liability whatsoever. GENERAL GUIDELINES FOR DERATION: Altitude: Derate 1% per 100 m (328 ft.) elevation above 400m (1312 ft.). Temperature: Derate 2.0% per 5°C (9°F) temperature above 40°C (104°F).

CONTROLLER FOR GENSET: CONTROL MEC 310 PANEL USC300

The Generator Controller MEC 310 is a microprocessor-based control unit containing all necessary functions for protection and control of a power generator. Besides the control and protection of the diesel engine it contains a full 3-phase AC voltage and current measuring circuit. The unit is equipped with an LCD display presenting all values and alarms.

- USC 300C Unit Mount Control Panel, Black Nema 1 enclosure c/w rubber mounts
- MEC 310 Microprocessor Based Engine Generator Controller
- Graphic Display 128 X 64 pixels (STN) Super Twisted Nematic
- Digital AC Metering:
  - 3-Phase Volts (Phase to Phase and Phase to Neutral),
  - 3-Phase Amps
  - Frequency
  - kW, kVAR, KVA, pF, kWHr
  - AC Protective Relaying:
  - 27/59 Under/Over Voltage
  - 32 Reverse Power
  - 51 Time Overcurrent
  - 81 O/U Under/Over Frequency
  - Digital gauge display:
  - Oil Pressure (sender required by others)
  - Coolant Temperature (sender required by others)
  - Fuel Level (sender required by others)
  - Hourmeter
  - Tachometer

- 5 digital inputs for alarms / shutdowns
- Dedicated Output Contacts - Engine Crank; Run (30 VDC / 6 Amps)
- Three Programmable Output Contacts (30 VDC / 1 Amps)
- Event Logging (30 events)
- Pushbuttons:
- Emergency Stop
- Manual Start and Stop
- Manual/Auto/Test
- Lamp Test
- Horn Silence
- Indicating Lights:
- Common Alarm
- Generator Ready (Voltage and Frequency Normal)

FEATURES

Electrical Rating: - Single or three phase, 600VAC maximum, 50/60HZ, 4 wire
- 12 or 24Vdc (nominal) supply, negative ground.
- Dedicated Output Contacts - Engine Crank; Run (30 VDC / 6 Amps)
- Three Programmable Output Contacts (30 VDC / 1 Amps)

Enclosure: - Black Nema 1 enclosure c/w rubber mounts

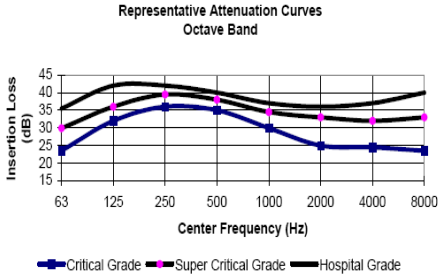
Engine Senders: - Oil pressure (1/8" NPT), Temperature (1/4"NPT) (Supplied loose for engine mounting).

Requirements: - Exceeds requirements of CSA 282 and NFPA 110 Level

OPTIONAL SILENCER ACCORDING TO THE APPLICATION

Silencer with different levels from attenuation

- Critical Grade
- Super Critical Grade
- Hospital Grade



Levels from attenuation

DOCUMENTATION AND OTHERS

- Manual of operation and maintenance
- Spare parts
- Maintenance
- Consulting

MISCELLANEOUS EQUIPMENT

- Batteries of 12 VDC with cables for battery connection with the Engine.

GENSET OPTIONS

Control Panel
USC 300C Control Panel is standard on all units see page 4 of spec sheet for standard features.
Another Type of control_____

Cooling System
Radiator

- ☐ Vertical Remote
- ☐ Horizontal Remote
- ☐ Radiator Duct Flange
- ☐ Antifreeze drain Extension

Fuel system

- ☐ Fuel Water Separator
- ☐ Day tank
- ☐ Auxiliary fuel pump
- ☐ Sub Base mounted Fuel Tank
  - ☐ Single Wall
  - ☐ Double Wall
  - ☐ UL listed
- ☐ Diesel Fuel Tank
  - ☐ 1000 L (264.1 gal)
  - ☐ 5000 L (1320.8 gal)
  - ☐ 15000 L (3962.5 gal)

Exhaust System

- ☐ Critical Grade
- ☐ Super Critical Grade
- ☐ Hospital Grade

Engine Electrical system
Battery

- ☐ Lead-Acid
- ☐ NiCad
- ☐ Battery Rack
- ☐ Battery Charger Automatic

Generator

- ☐ Breaker in the alternator
- ☐ PMG excitation &DVR 2000 Regulator

OPTIONAL ACCESSORIES AVAILABLE FOR THE EQUIPMENT

Vibration isolation

- ☐ Rigid Spring Mounting
- ☐ Resilient Mounting

Filters

- ☐ Air Filter for Medium Dust Environments
- ☐ Air Filter of Heavy Dust Environments

Drain

- ☐ Oil drain Extension

Enclosures

- ☐ Sound Attenuated
- ☐ Weather Proof
- ☐ Stainless steel cover
- ☐ Trailer Mounting
- ☐ Interior lights Ac or DC

Heaters

- ☐ Jacket Water Heater
- ☐ Crankcase Oil Heater

Insulation Blankets

- ☐ Features:
  (Temperature to 1260°C (2300°F)
  Non-Combustible, Highly Resistant to Vibration, Oil, Fuel, Grease, and Moisture Resistant Exterior, Personal Protection

Notes

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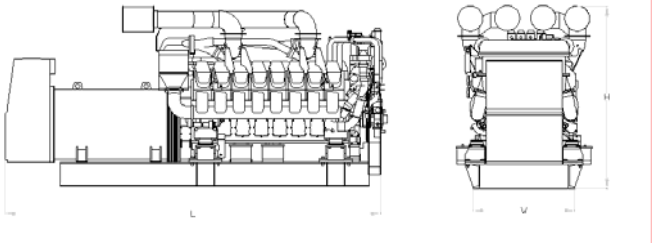
DIMENSIONS



LENGTH	WIDTH	HEIGHT
mm (in)	mm (in)	mm (in)
4822 (190)	1670 (65.7)	2309 (90.9)

NOTES: - General configuration not to be used for installation. See general dimension drawing for detail.
- The dimensions of GENSET can change due to the radiator option

SERVICES

- Development of the project.
- Development of engineering.
- Equipment's Installation
- Engineering for special applications.
- Synchronies with utility network or more Gensets.
- Attention and technical support

INSTALLATION OPTIONS OF THE GENSET

- On-Site
- ISO Container
- Trailer