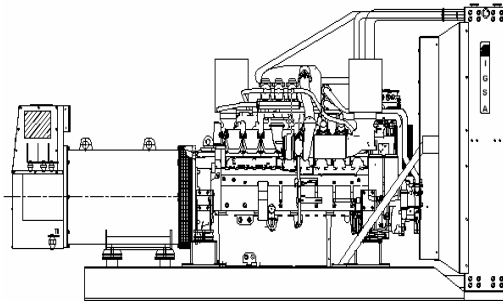




MAQUINARIA IGSA POWER GENERATION SYSTEMS



MODEL: GSDD21000M
DIESEL ENGINE: DETROIT DIESEL
MODEL: 16V2000G84-TB, TIER II
CAPACITY: 1000kW; 1800 RPM

RATINGS RANGE

PRIME hp (kW)

1354.3 (1010)

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

3 Exhaust gases silencer, and a section of flexible tube for connection purposes.

4 Engine **DETROIT DIESEL, 16V2000G84-TB. TIER II**

5 Marathon Alternator

6 Radiator

7 Control MEC 310 (panel USC300)

8 Base of structural steel

GENERAL FEATURES

- **IGSA GENSET** of, **1000 kW to 480V, 460V, 440V, 416V, 380 VAC**, 3 Phase, 4 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)



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ENGINE SPECIFICATION DATA MODEL 16V2000G84-TB

Weight 7013.7Lb (3180 Kg)

General Data	
Model	16V2000G84-TB
Combustion System	Direct Injection
Chargin method	Exhaust turbo charger and Water charge air cooling external
Bore x Stroke	130/150 mm
Displacement, total	31.84 Liter
Number of cylindres	16
Cylinder configuration	V - 90°
Compression Ratio	16
Direction of rotation	Left
Flywheel housing flange	SAE 0
Flywheel interface	18"
Starter ring-gear teeth no.	118
Injection system	Electronically controlled high-pressure injection
Control/Monitoring	Electronic engine Management system ADEC
Number of turbo chargers	2
Number of intercooler	1
Power (ISO 3046)-- kW	1010
Mean Piston speed—In/s (m/s)	35.4 (9.0)
Mean effective pressure	21.2
Physical Data	
Weight, dry—Lb (kg)	7013.7 (3180)
Weight, wet-- Lb (kg)	7521 (3410)
Length--in.(mm)	82.7 (2100)
Height--in.(mm)	62.2 (1580)
width--in.(mm)	69.9 (1775)
Fuel Consumption (Standby)	
100 % Power-- g/kWh	208
75 % Power-- g/kWh	218
50 % Power-- g/kWh	213
Lube oil consumption (after run in)	0.5
Capacity	
Engine oil Cap, ininitial Filling (standard oil system)--Gl (Lt)	27 (102)
Oil pan capacity, dipdtick mark min.-- Gl (Lt)	18.3 (69)
Oil pan capacity, dipdtick mark max.-- Gl (Lt)	23.24 (88)
Engine coolant capacity (without equipment)-- Gl (Lt)	34.4 (130)
Intercooler coolant capacity-- Gl (Lt)	5.3 (20)
Heat dissipation	
Engine coolant dissipation 100% load-- kW	-
charge-air heat dissipation 100% load—Kw	-
Radiation and convection heat, engine—Kw	-
Noise emission	
(Free-field sound pressure level, 1m distance)	-
Engine surface noise-- dB(A)	-
Exhaust noise, unsilenced-- dB(A)	-

Starter System	
Electrical Starter (make Delco)	
Starter, rated voltage-- V	24
Starter, rated power-- kW	9.5
Starter, power requirement max-- A	1900
Starter, power requirement at firing speed-- A	80
Recommended battery capacity Lead-acid-- Ah/20h	-
NiCd--Ah/5h	-
Firing speed--1/min	100-120
Coolant pre-heating100-120	
Preheating temperature (min.)-- °C (°F)	32 (89.6)
Heater performance-- kW	4
Coolant system, Engine coolant circuit	
Coolant temperature (at engine outlet to cooling equipment)-- °C (°F)	95 (203)
Coolant temperature after engine, alarm-- °C (°F)	97 (206.6)
Coolant temperature after engine, shutdown-- °C (°F)	102 (215.6)
Coolant antifreeze content, max. Permissible-- %	50
Cooling equipment: coolant flow rate-- m³/h	50
Coolant pump: inlet pressure, min.-- bar	0.4
Coolant pump: inlet pressure, max.-- bar	1.52
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	2.2
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	15.5
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	2.2
Combustion Air m³/s	
Combustion air volume flow new filter-- mbar	30
Intake air depression limit value-- mbar	50
Fuel System	
Fuel supply flow, max.-- l/min	8.0
Fuel temperature max. °C (°F)	60 (140)
Fuel pressure at supply connection on engine, min. Admissible-- bar	+0.5
Fuel pressure at supply connection on engine, max. Admissible-- bar	-0.3
Exhaust system	
Exhaust volume flow-- m³/s	3.3
Exhaust temperature after turbocharger-- °C (°F)	570 (1058)
Exhaust backpressure limit value—mbar	30
General operating data	
Recomendad minimum continuous load-- %	20
Engine mass moment of inertia, with standard flywheel-- kgm²	3.269



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MARATHON. ELECTRIC ALTERNATOR MODEL 575RSL4044

Weight 2267 kg (5000 Lb)

Kilowatt ratings kW (kVA)	1800 RPM 3 Phase			60 Hertz 0.8 Power Factor			4 Bus Bars Dripproof or Open Enclosure		
	Class B	Class F						Class H	
Voltage	176 °F 80° C (1) Continuous	194°F 90° C (1) Lloyds	203°F 95° C (1) ABS	105° C (221)°F British Standard	221°F 105° C (1) Continuous	266 °F 130° C (1) Standby	125° C (257)°F † British Standard	257°F 125° C (1) Continuous	302°F 150° C (1) Standby
	480	800 (1000)	880(1100)	880(1100)	975(1219)	975(1219)	1060(1325)	1025(1281)	1050(1313)
460	800 (1000)	865(1081)	840(1050)	950(1188)	950(1188)	1040(1300)	1020(1275)	1020(1275)	1120(1400)
440	785(981)	845(1056)	825(1031)	925(1156)	925(1156)	1010(1263)	990(1238)	995(1244)	1090(1363)
416	760(950)	820(1025)	785(981)	890(1113)	890(1113)	975(1219)	945(1181)	950(1188)	1040(1300)
380	720 (900)	765(956)	730 (913)	830(1038)	830(1038)	830(1038)	830(1038)	830(1038)	830(1038)

(1) Rise by resistance method, Mil-Std-705, Method 680.1b.

Rating per BS 5000.

Submittal Data: 480 Volts, 1060 kw, 1325 kVA, 0.8 P.F., 1800 RPM, 60 Hz, 3 Phase					
Mil-Std-705B			Mil-Std-705b		
Method	Description	Value	Method	Description	Value
301.1b	Insulation Resistance	> 1.5 Meg	505.3b	Overspeed	2250 RPM
302.1a	High Potential Test		507.1c	Phase Sequence CCW-ODE	ABC
	Main Stator	2000 Volts	508.1c	Voltage Balance, L-L or L-N	0.2%
	Main Rotor	1500 Volts	601.4a	L-L Harmonic Maximum - Total (Distortion Factor)	5.0%
	Exciter Stator	1500 Volts	601.4a	L-L Harmonic Maximum - Single	3.0%
	Exciter Rotor	1500 Volts	601.1c	Deviation Factor	5.0%
401.1a	PMG Stator	1500 Volts	--	TIF (1960 Weightings)	<50
	Stator Resistance, Line to Line High Wye Connection	0.003			
Ohms	Rotor Resistance	0.704	652.1a	shaft current	<0.1 ma
Ohms			--	Main Stator Capacitance to Ground	0.047 mfd
	Exciter Stator	23 Ohms	Additional Prototype Data		
	Exciter Rotor	0.7 Ohms	Type Ext. Voltage Regulated, Brushless		
410.1a	PMG Stator	2.1 Ohms	--	generator Frame	575
	No Load Exciter Field Amps		--	Type	
	at 480 Volts Line to Line	0.82 A DC	MAGNAMAXDVR		
420.1a	Short Circuit Ratio	0.583	--	Insulation	Class H
421.1a	Xd Synchronous Reactance	2.706 pu	--	Coupling	Flexible
422.1a	X2 Negative Sequence		--	Amortisseur Windings	Full
	Reactance	0.189 pu	--	Excitation	Ext. voltage Regulate, Brushless
423.1a	X0 Zero Sequence Reactance	0.062 pu	--	Voltage Regulator	DVR2000
425.1a	X'd Transient Reactance	0.128 pu	--		
426.1a	X''d Subtransient Reactance	0.102 pu	--	Voltage Regulation	0.25%
--	Xq cuadrature Synch React.	0.691 pu	--	Cooling Air Volume	1150 CFM
427.1a	T'd Transient Short Circuit		--	Heat rejection rate	3138 Btu's/min
	Time Constant	0.127 sec.	--	Full load rate current	1594 amps
428.1a	T''d Subtransient Short Circuit		--	Minimum Input hp required	1494.9
	Time Constant	0.011 sec.	--	Efficiency at rated load	95.1%
430.1a	T'do Transient Open Circuit		--	Full load torque	4360 Lb-ft
	Time Constant	2.38 sec.	--		

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 a 12 hour period. 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 0.1% per 100 m (328 ft.) elevation above 400 m (1312 ft.). Temperature: Derate 3.0% per 5°C (9°F) temperature above 40°C (104°F).



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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)

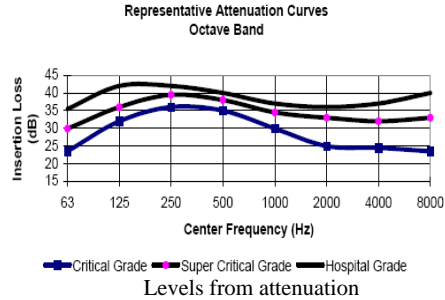
FEATURES

- 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



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 _____

Cooling System

Radiator

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

Fuel system

- Fuel Water Separator
- Day tank
- Auxiliary fuel pump

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

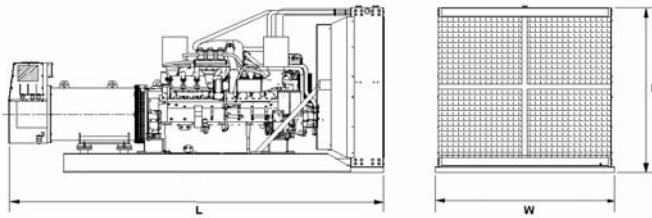
- Jacket Water Heater
- Crankcase Oil Heater

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

DIMENSIONS



LENGTH	WIDTH	HEIGHT
mm (in)	mm (in)	mm (in)
4763.26 (187.5)	22731 (89.49)	2209.54 (86.99)

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

